Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Access Charge Reform	)	CC Docket No. 96-262
	)	
Price Cap Performance Review for Local Exchange Carriers	)	CC Docket No. 94-1
	)	
MCI/WorldCom Telecommunications Corporation Emergency Petition for Prescription of Access Charges	)	CC Docket No. 97-250
	)	
Consumer Federation of America Petition for Rulemaking	)	RM 9210

REPLY COMMENTS OF THE UNITED STATES TELEPHONE ASSOCIATION

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SUMMARY

In its reply comments, USTA urges the Commission to continue its efforts to support the superior market performance of incentive-based regulation which has resulted in lower access prices, increased efficiency and substantial investment in the infrastructure and implement the market-based approach it adopted over a year ago. Arguments in support of prescriptive access rate cuts, a higher X-Factor as well as statements that sufficient competition does not exist are unsupported and should be rejected. USTA refutes these arguments as follows:

- price cap regulation is working, although an accurate X-Factor is critical;
- prescriptive access charge reductions will reduce investment abilities and incentives;
- transferring earnings from incumbent LECs to IXCs will discourage CLEC investment thereby reducing competition;
- prescriptive access charge reductions will threaten universal service;
- prescriptive access charge reductions will prevent recovery of all costs of production;
- prescriptive access charge reductions will not benefit residential or small business customers of long distance service;
- earnings data relied on by IXCs do not support prescriptive access cuts;
- interstate total factor productivity relied on by IXCs is an oxymoron and without meaning in economic theory;
- the Commission's productivity model must be modified to reflect employment and access restructuring which require a lower X-Factor;
- future opportunities to achieve higher productivity gains are diminishing;
- the market-based approach to access pricing is economically sound;

- pricing flexibility should have been granted when the market was first opened to competition to prevent welfare losses;
- pricing flexibility will not result in anticompetitive behavior;
- access competition has progressed faster than anticipated;
- financial and competitive market assessments of IXCs and others are inconsistent with the views of Wall Street securities analysts.

Based on this clear and incontrovertible evidence, the Commission should move quickly to implement the market-based approach to access reform by implementing USTA's universal service proposal for non-rural carriers; implementing USTA's proposal establishing the mechanism to reduce regulation once competitive triggers have been met; reducing the X-Factor and releasing the proposed rulemaking on historical cost recovery.

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The United States Telephone Association (USTA) respectfully submits its reply to the comments filed October 26, 1998 in the above-referenced dockets.

I. INTRODUCTION AND SUMMARY.

In its update of the public record in the proceedings listed above, USTA provided the following new evidence:

- incentive-based price cap regulation is working;
- rates for interstate access have decreased by about $11 billion or to approximately $0.017 per minute of use;
- the bargain inherent in incentive-based price cap regulation has allowed incumbent LECs to achieve successful, yet reasonable, earnings levels;
- incumbent LECs should not be punished for successful earnings, particularly when access rates are decreasing, investment in the telecommunications

infrastructure continues at over $20 billion annually; and earnings levels are modest compared to other corporations;

- prescriptive cuts in access prices are not economically justified;
- prescriptive cuts in access prices will not benefit residential customers due to the fact that the major IXCs refuse to pass through reductions in access costs in the form of lower long distance prices for residential customers preferring instead to reap windfall profits;
- prescriptive cuts in access prices will harm universal service;
- updating the Commission's own productivity model and the USTA TFPRP model shows that the upward trend the Commission relied upon to justify the current X-Factor did not materialize and that the current X-Factor must be lowered
- updating the FCC model results in an average X from 1993 - 1997 of 4.4 percent and updating the USTA TFPRP results in an average X of 3.0 percent for the same period;
- changes in the access charge structure and increased competition will make an historical productivity target more difficult to achieve as easier early efficiency gains have been realized and the point of diminishing marginal returns has set in;
- the consumer productivity dividend is no longer relevant and should be eliminated
- the economically-sound market-based approach to access pricing adopted by the Commission and upheld by the U.S. Court of Appeals for the 8th Circuit should be implemented by adopting USTA's proposed a mechanism which permits regulation to decrease as competitive triggers are met, incorporating the proposals submitted by Ameritech and Bell Atlantic; and,
- local competition is sufficient to constrain interstate access prices.

Most commenting parties continue to ignore the superior market performance of incentive-based price cap regulation which has resulted in lower access rates, increased efficiency and substantial investment in the network. Instead of updating the record, they continue to repeat old, self-serving arguments. AT&T, MCI/WorldCom and other competitors of incumbent LECs continue to argue that access rates must be lowered to incremental cost

through a prescriptive access rate cut, that the X-Factor must be increased and that sufficient competition does not exist to warrant any regulatory relief for the only regulated access service providers: incumbent LECs. The Commission already rejected these arguments and should dispose of them once and for all. In its comments, USTA pointed out that the public record strongly repudiates such unsupported arguments and USTA will reply to each in the remainder of its reply comments.

In Attachment A, Dr. William Taylor of the National Economic Research Associates (NERA) provides an economic analysis which explains again why the market-based approach to access pricing must be maintained and why the prescription of access is economically flawed. Dr. Taylor responds to AT&T's consultants and exposes the illogic of their arguments regarding pricing flexibility. He also explains, again, that an interstate only productivity factor is economically meaningless.

Dr. Larry Darby, at Attachment B, provides an explanation of how a prescriptive approach will harm the ability and incentive of incumbent LECs and others to invest in local exchange facilities that are used to provide interstate, interexchange access. He provides an overview of market analysts' assessments regarding the growth of CLECs and the increasing risk for incumbent LECs which refutes the statements about competition made by AT&T and MCI WorldCom. He also points out that market analysts do not consider rate of return earnings to be a relevant benchmark under riskier incentive regulation.

Professor Frank Gollop, at Attachment C, restates the fact that economic theory unambiguously dictates that there is no economically meaningful way to allocate inputs and input costs to distinct outputs in the context of joint production of services. Thus, there can be

no economically meaningful interstate only productivity model.

At Attachment D, Professor Gollop recommends changes to the Commission's productivity model to reflect two significant economic variables: employment and access rate restructuring which would improve the results of that model to more accurately reflect the fact that easier early efficiency gains have been realized. Future opportunities to achieve higher productivity gains are diminishing and the Commission's model should be adjusted accordingly.

Based on the clear and incontrovertible evidence presented by USTA, the Commission should move aggressively and quickly to implement the market-based approach as follows: implement USTA's universal service proposal for non rural carriers; implement USTA's proposal establishing the mechanism to reduce regulatory constraints once competitive triggers are met; reduce the X-factor; and release the proposed rulemaking on historical cost recovery.

II. THE PRESCRIPTIVE APPROACH TO ACCESS PRICING MUST BE DISCARDED ONCE AND FOR ALL.

It is particularly troubling that the Commission continues to entertain requests to abandon the market-based approach it has not yet fully implemented in favor of a prescriptive reduction in access prices. Commenters continue to urge the Commission to prescribe access charges at forward looking incremental costs by recommending that incumbent LECs submit forward looking cost studies and that access prices be lowered to reflect these hypothetical costs[1] or by recommending that the X-Factor be increased to outrageous levels.[2] One party just states that the Commission should reduce access rates by $2 billion overall, without providing any specific

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[1] CompTel at 9.

[2] AT&T at 1-2, MCI WorldCom at 1-3.

rationale to support such a statement.[3] As the record clearly shows, these ideas represent bad economic and legal policy and must be disposed of once and for all. As explained below, such an approach is detrimental to the maintenance of universal service, will not permit the full recovery of the costs of production, will destroy incentives to invest by both incumbents and others and will not produce lower prices for residential and small business customers.

A. Prescriptive Access Rate Cuts Will Thwart Competition.

Prescriptive access rate cuts will inhibit competition. As discussed in Attachment B by Dr. Larry Darby, lowering access charges will reduce the opportunity to earn and the incentive to invest in local facilities by incumbent LECs. This will also be the case for other carriers. Incentives for any carriers to invest in local facilities in competition with the incumbent LECs and/or to bypass incumbent LEC facilities will also be reduced.

The CLECs are diverse and have different business plans relying on different technologies to target the lucrative high end market for access services. CLECs consider potential access revenues as a means to recover their costs to enter the access market. A drastic reduction in access revenues would thwart the incentives for CLECs to compete. As two of the largest independent CLECs explain:

> Based on the Commission's decision not to impose a prescriptive or regulatory approach to access charges, but to allow market forces to reform access charges, the investment community has had the confidence to make substantial investments in the competitive local exchange carriers, including companies like NEXTLINK. The Commission's decision to allow market forces to reform access markets has spurred capital funding of over twenty billion dollars in investments by CLECs in facilities and other local infrastructure that will be utilized to provide competition in access markets. The investment by

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[3] Competitive Policy Institute at 9.

these new entrants have resulted in the deployment of literally hundreds of switches as well as thousands of miles of fiber that would not have been as economically feasible absent the Commission's commitment to a market-based approach to access reform.

> The important steps the Commission has taken have started to take hold. As progress continues from the investment being made to create a fully competitive access market, the Commission must stay its course. The use of a prescriptive approach in the midst of market-driven reform could chill the current positive environment for CLEC investment and freeze the development of actual competition in access markets.[4]

These views are consistent with those of Time Warner:

> The Commission should reject requests to adopt prescriptive measures for driving access charges to forward-looking economic costs. Market-based policies continue to represent the preferred means of accomplishing public interest objectives. Although a prescriptive approach offers short-term price reductions, these prices are less efficient than prices determined by a competitive market. Any efficiency gains resulting from a prescriptive approach are static, one time events that require maintenance through regulatory oversight, with no assurance that the resulting rates reflect the underlying cost of providing the service...Finally, and most importantly, a market-based approach will permit the realization of dynamic long-term benefits, such as the entry of firms with lower costs than the ILECs.[5]

As Dr. Darby explains, earnings margins are the magnet that draws competitive entry. Prescribing access rates to some measure of forward looking economic cost could squeeze CLECs from the market and prevent others from entering. This is obviously not a pro-competitive approach. Given a choice between furthering the pro-competitive goals of the Act, or lining the pockets of AT&T and MCI WorldCom, it is clear that the prescription of access rates must be rejected.

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[4]NEXTLINK at 4-5.

[5]Time Warner at 3-4.

B. Prescriptive Access Rate Cuts Will Impact Universal Service.

The record certainly reveals a lack of interest in universal service on the part of the competitors of the incumbent LECs. These parties continue to ignore the vital role that access charges have played in the preservation of universal service and apparently have little regard for either universal service or residential customers. CompTel blithely states that one of the incumbent LECs' "favorite demons is the claim that reductions in access rates may threaten universal service policies." CompTel submits that the Commission should promptly complete the universal service support funding mechanism so that *then* it may complete the task of reforming access charges.[6] USTA couldn't agree more and has consistently asked the Commission to do just that.

CompTel may consider universal service little more than a nuisance to be dealt with and other telecommunications providers can ignore its significance in this debate, but USTA suspects that along with incumbent LECs both state and federal regulators and Congress may be more than a little concerned about both universal service and residential and small business customers. As Dr. Taylor explains in his reply at Attachment A appended hereto:

> access charge reform cannot even be contemplated in isolation from reform of the current universal service system. Access charges — along with rates for several other services — currently provide substantial implicit support to universal service. The replacement of such implicit support by explicit support from a separate universal service fund — the cornerstone of universal service reform — would automatically allow subsidy elements to be removed from current access charges. Because of this fact, the level and structure of an explicit universal service fund and the relationship between the federal and state universal service funds is critical to any access charge reform proposal. Realizing the inherent linkages among the current system of interstate access charges, the current mode of supporting

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[6] CompTel at 5.

> universal service, and the role of price cap regulation in disciplining access rates, the FCC has laid out a multi-phase plan of reform which ensures that elements of all three are coordinated as reform goes forward. Singling out access rate for prescriptive regulation would break a crucial link in this three-way chain and, in effect, disrupt the rest of that reform plan. While IXC interests may well be served by having access charges reduced prescriptively to cost before the coordinated reform plan has been implemented, other carriers, customers, and the future of telecommunications itself would undoubtedly be harmed by such a course of action.[7]

Switched access rates currently contain substantial amounts of implicit support for universal service. This support helps to keep universal service at affordable levels. Switched access rates also allow incumbent LECs to recover their contributions to the schools and libraries, low income, rural health care and high cost portions of the federal universal service fund.

USTA has recommended that, at a minimum, the implicit support represented in the CCL charge, the PICC and the non-service specific TIC be made explicit, as demanded by the Telecommunications Act of 1996, and recovered through the federal universal service fund.[8] If

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[7]Taylor at 10.

[8]The CCL and PICC charges are part of switched access revenues collected form IXCs. Included in these revenues are the following major universal service cost components: 1). The overflow from Subscriber Line Charges (SLC) of Base Factor Portion (BFP) costs. These costs include interstate loop and switching line port costs. Today, incumbent LECs recover these costs through a combination of SLCs, PICCs and the CCL. The overflow of these BFP costs from the SLC to the PICC and CCL is designed to recover the difference between the $3.50 cap on primary line residence and single line business and the cost of providing universal service. The Federal-State Joint Board agreed that the SLC cap affects affordability and should not be changed. *Federal State Joint Board on Universal Service*, CC Docket No. 96-45, (rel. May 8, 1997) at ¶¶ 761-762. In addition, this overflow recovers the revenue shortfall between the SLC cap and revenues generated by most non-primary lines and some multi-line business lines. 2). Marketing costs. Effective January 1, 1998, interstate marketing expenses were shifted from switched access rates to multi-line business and non-primary line residence customers. Because

(continued...)

the Commission fails to permit such recovery, this implicit support will remain in switched access rates. Despite the fact that such a decision would be contrary to the Act, the Commission would then have to continue to permit recovery of this implicit universal service support through switched access rates. Thus, the claims of MCI/WorldCom and CompTel that universal service concerns can be ignored once the hypothetical universal service cost model is implemented on July 1, 1999 are untrue.[9] Unless and until the Commission first adopts explicit recovery of the implicit support contained in switched access prices, it cannot consider arbitrarily slashing access prices as these parties recommend. The Commission's own rules stipulate that 25 percent of loop costs are assigned to the interstate jurisdiction for purposes of recovery. The Commission must permit incumbent LECs to recover those costs and should, therefore, immediately adopt and implement USTA's universal service proposal for non-rural carriers.

In addition, switched access rates are also burdened with the recovery of historical investments. Arbitrary reductions in access prices would prevent recovery of such costs.[10] The Commission should implement its promised proceeding on this issue prior to any consideration of access charge reductions.

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[8](...continued)
of the SLC caps on these customers, marketing costs that exceed the caps overflow to the PICC and CCL. 3). The residual interconnection charge. This charge, which will be eliminated over time, is also being recovered through the PICC and CCL. These costs are joint and common costs allocated to the interstate jurisdiction through the separations process which reduces the costs which must be recovered from the state jurisdiction.

[9]CompTel at 5, MCI/WorldCom at 25-27.

[10]USTA Comments, CC Docket No. 96-262, January 29, 1997 at 72.

C. Prescriptive Access Rate Cuts Will Prevent Recovery of Fixed Costs.

In his reply, at Attachment A, Dr. Taylor responds to the assertions of both AT&T and MCI/WorldCom that prescriptive remedies are required because they believe access prices are above their perception of forward-looking economic costs.[11] Dr. Taylor states that the price for any service should not be set prescriptively at its incremental cost or even at incremental cost plus some arbitrary percentage markup for shared fixed and common costs. The telecommunications industry is characterized by significant fixed costs. A multi-product firm with substantial fixed costs cannot set prices at incremental costs because such prices would not permit the firm to recover all of its economic costs of production. Dr. Taylor shows that neither AT&T nor MCI/WorldCom price at incremental cost, since the incremental cost (including the cost of access) of providing toll service is only about one third the average rate charged by these companies.

> From this pattern and size of markups of prices above incremental costs for long distance services, I reach three conclusions. First, the need to reduce carrier access prices prescriptively and immediately in the name of economic efficiency is grossly exaggerated. The welfare gains from reducing carrier access charges to economic cost are tiny compared with, for example, the potential welfare gains from reducing toll rates to economic cost. Second, the likelihood of error in measuring incremental costs and particularly in determining the amount of shared fixed and common costs that market conditions permit is substantial. The potential damage from these errors includes the distortion of competition for exchange and exchange access services, discouraging efficient facilities-based competitors from entering to serve the exchange access market and expanding to supply local exchange services. Third, even if the incremental and appropriate shared fixed and common costs of access services in each market could be measured precisely, prescriptive pricing and return to cost-of-service regulation of carrier access services — even if done correctly — would be a regulatory step in the wrong direction. The Commission has correctly recognized the efficiency

[11] AT&T at 19 and Attachment B and MCI/WorldCom at 24.

> gains from price cap regulation and the detrimental effect on incentives to reduce costs and increase productivity from cost-of-service regulation. As competition, or even the threat of competition, increases, the harmful effects of cost-of-service regulation on customers increases. Because it made sense to adopt price cap regulation eight years ago, it continues to make sense today.[12]

The economic level of access prices should be determined by the marketplace and not by an artificial incremental cost calculation plus some arbitrary allocation of fixed costs. If competition is slow to develop, price cap regulation provides a sufficient safeguard to protect customers.

D. Prescriptive Access Rate Cuts Will Not Benefit Residential or Small Business Customers.

As USTA pointed out in its comments, there is no evidence to date that prescriptive access rate cuts will provide any benefits other than to line the pockets of the major IXCs who, not only have failed to pass through any reductions in interstate access prices to residential customers, but despite reductions in cost, are actually increasing residential long distance rates. It also appears that the major IXCs have failed to pass on to small business customers the reductions in per-minute access charges resulting from the access charge restructure effective January 1, 1998, although they did pass on the higher PICCs and new universal service charges to these customers. In a report submitted by the Office of Advocacy of the U.S. Small Business Administration, Mr. Paul S. Brandon of NERA analyzes a sample of small business customers and concludes that the major IXCs also increased the average interstate domestic bill for small business customers by about $0.021 per minute or 26 percent. Mr. Brandon notes that if the long distance market for small business customers were effectively competitive, then the IXCs would

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[12] Taylor at 9-10.

have changed rates by about the same amount as their change in access costs.

III. THERE IS NO EVIDENCE TO SUPPORT INCREASING THE PRODUCTIVITY FACTOR, IN FACT, UPDATING THE MODELS REVEALS THAT THE CURRENT FACTOR MUST BE LOWERED.

The Commission interpreted its productivity results to reflect a perceived upward trend in productivity growth from 1992 to 1995. USTA provided the results of Professor Gollop's update of the Commission's and USTA's productivity models which demonstrate that the current X-Factor is too high. Communications Workers of America also submitted a study showing that an X-Factor of 3.1 percent would more accurately reflect annual industry productivity gains.[13] Professor Gollop and Dr. Taylor refute arguments that the Commission concoct an interstate only productivity number to justify a higher X and Mr. Darby dismisses arguments that seek to justify a higher X based on earnings levels. Finally, Professor Gollop provides evidence that past productivity gains cannot be maintained given updated data on employment levels and the impact of the restructuring of access charges implemented on January 1, 1998.

A. The Commission Should Not Alter Its Decision to Reject an Interstate Only Productivity Factor.

Both Dr. Taylor in his reply at Attachment A and Professor Gollop at Attachment C reveal the fallacies in the arguments of AT&T, MCI/WorldCom and others that the Commission should reverse its previous decision and base X on something those parties like to call interstate productivity growth.[14] Simply put, economic theory is clear: there is no such thing. The concepts of interstate or intrastate productivity growth just do not exist. The Commission should

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[13] Communications Workers of America at 4.

[14] AT&T at 16, MCI/WorldCom at 4, and American Petroleum Institute at 10.

not entertain such baseless arguments and devote its resources to more constructive and important issues such as implementing the market-based approach to access pricing.

Professor Gollop observes that it is an uncontested principle of microeconomic theory that production of multiple products with common and joint inputs is not separable into distinct parts. He notes that it is not possible to examine the cost (productivity) conditions of each output in isolation because the multiple outputs are not produced in isolation.

Professor Gollop refutes AT&T's arguments that increased interstate rates of return are evidence of increased interstate productivity growth. He says this argument is simply false, because any computation of an interstate rate of return must be premised on an allocation of costs among interstate and other services, an allocation which, because of common and joint production, economic theory dictates cannot be accomplished in any economically meaningful way. He points out that the allocation rules themselves are arbitrary and are not based on any underlying economic reality. Likewise, since accounting measures of interstate rates of return are not tracking changes in economic costs in interstate services, accounting rates of return are not tracking productivity growth in interstate services. According to Professor Gollop, AT&T's intention is to convince the Commission to abandon price cap regulation and to resuscitate rate of return regulation.

Professor Gollop also tests AT&T's repeated assumption, apparently now embraced by MCI WorldCom, that interstate inputs grow at the same rate as total company inputs. Using AT&T's own data and the data utilized by the Commission in the price cap order, Professor Gollop concludes that the assumption is wrong. Finally, he notes how AT&T misinterprets the testimony of experts and corrects AT&T's flawed contention that greater output growth

generates greater productivity growth. In the presence of scale economies, such a proposition is true; however, scale economies reside in the common and joint inputs and therefore apply to the entire network as a whole. There is no distinction in scale economies for interstate, intrastate and local services.

Dr. Taylor agrees that AT&T's proposal to measure interstate productivity growth by substituting interstate output growth for total output growth in the formula used by the Commission to measure total factor productivity is economically meaningless and has no bearing on the rate at which interstate unit costs and prices could be expected to fall over time in the future.

Dr. Taylor also refutes AT&T's mischaracterizations of testimony in intrastate regulatory proceedings[15] and explains that the positions taken are entirely consistent: TFP growth for the entire firm — not just for a subset of services — should be the basis on which the productivity offset is determined in both interstate and intrastate jurisdictions. He notes that the citations quoted out of context by AT&T generally explain why the interstate X value determined by the Commission is inappropriate for use in a price cap plan for intrastate services. He states that AT&T is mistaken in its conclusions regarding these citations. Statements by economists that growth in output leads to higher TFP growth for the firm and growth in high markup services contributes more to TFP growth than growth in low markup services do not support AT&T's position. These statements were made in relation to the fact that TFP growth for the firm will be higher, not that TFP growth somehow defined, for a high-growth or high-margin service will be

[15] AT&T at 18-19.

higher than TFP growth for a low-growth or low-margin service. The fact that interstate services are growing more rapidly and carry a higher margin than intrastate services does **not** imply that TFP growth for interstate services, if it could be defined which it cannot be, would be higher than for intrastate services, nor that unit costs for interstate services would fall faster than for intrastate services, nor that the appropriate X-Factor in a price cap plan would be higher for interstate services than for intrastate services.

B. Earnings Levels of Incumbent LECs Do Not Justify a Higher X-Factor.

The claims of AT&T, MCI/WorldCom and other parties that earnings levels of incumbent price cap LECs indicate the X-factor should be 9.2 percent or higher are completely unfounded.[16] AT&T is also wrong when it adds that if the 6.5 percent X-Factor was really too high, industry earnings would not have improved in 1997.[17]

AT&T's assertion that earnings and the X-factor can be linked contradicts its own position before it was declared to be non-dominant and reveals the self-serving nature of its position. Inserting "*ILEC*" in place of "*AT&T*" in AT&T's previous arguments requesting relief from price cap regulation clearly demonstrates this. "[t]hey naturally prefer the current asymmetric regulatory regime which imposes higher costs on *ILECs* than on them and affords them a variety of competitive advantages denied to *ILECs*."[18] Increasing the X-Factor to 9.2 percent would clearly increase costs in the current asymmetric regulatory regime. Operating

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[16]MCI at 4, 28 and AT&T at 22.

[17]AT&T at 22, 24.

[18]Revisions to Price Cap Rules for AT&T, CC Docket No. 93-197, Comments of AT&T at Attachment, June 30, 1995, filed July 24, 1995. [emphasis added.]

under an X-Factor set at three percent, AT&T eloquently opposed efforts to utilize higher earnings as an indication that the productivity factor be increased:

> AT&T's interstate returns are even more clearly reasonable when evaluated as the product of price cap regulation rather than rate of return regulation. Under the former, AT&T assumes far greater risk and commensurate potential to increase profitability. Indeed, all the many benefits of price cap regulation stem from this potential for increased profitability. A broader zone of reasonable returns is a necessary complement of providing both greater risk and reward, and increased returns demonstrate that the price cap system of incentives is proving successful... Rates of return cannot be compared directly to percentage price changes mandated by the price cap index or otherwise achieved through efficiency gains...More importantly, efficiency is a function of changes in output with given inputs, which include economic capital costs rather than any changes in book capital, as used in the calculation of rates of return.[19]

AT&T was correct and its reasoning still holds for the incumbent LECs as well. The Commission also agreed. "As we have said consistently in our discussion of price cap regulation over the years, we achieve beneficial incentives by placing less rather than more importance on LEC interstate earnings."[20] Earnings levels are not relevant under price cap regulation wherein regulated firms are encouraged to increase earnings if prices are capped and they can achieve reasonable efficiency gains. Penalizing the incumbent LECs, as AT&T, MCI/WorldCom and other competitors advocate, for being successful must not become Commission policy. There is no justification for these attempts to harm incumbent LECs other than to try to prevent them from competing in the marketplace.

AT&T asserts that incumbent LEC earnings would not have continued to increase in 1997 if the 6.5 percent X-Factor really reflected the incumbent LECs' capability to achieve that

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[19] AT&T Comments, CC Docket No. 92-134, filed September 4, 1992.

[20] Price Cap Order at p.25.

level of productivity gains.[21] AT&T's conclusion is based on faulty assumptions and is, therefore, incorrect. First, productivity cannot be interpreted based on accounting earnings because accounting earnings do not reflect productivity gains. Second, the 6.5 percent X-factor, even with the additional 1.2 percent 'lookback' reduction to 1996, has affected 1997 earnings only on a half-year basis since the July 1 effective date. Third, the X-Factor is not a punishment for healthy earnings. It is not a trigger to be raised whenever earnings increase. It is supposed to reflect an accurate level of achievable productivity. For price cap regulation to operate optimally, an accurate representation of productivity which is borne out by total factor productivity data must be utilized.

MCI/WorldCom inappropriately compares the earnings progress released by the incumbent LECs in third quarter earnings reports by representing corporate holding company performance as incumbent LEC performance.[22] MCI/WorldCom apparently is attempting to leverage the performance of some parent holding company financials as support for its misguided arguments. The comparison is invalid and the Commission should not consider this argument.

MCI WorldCom also repeats its allegations that incumbent LECs are earning excessive profits based on EBITDA (Earnings Before Interest, Taxes and Depreciation) results.[23] As discussed by Dr. Darby at Attachment B and as previously refuted by USTA, the stand-alone

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[21] AT&T at 24.

[22] MCI WorldCom at 34 and Attachment A.

[23] MCI WorldCom at 11.

level of EBITDA is meaningless as a measure of profitability.[24] The fact that EBITDA is high indicates that the telecommunications market is capital intensive, characterized by high investment and associated depreciation expense, factors which no party denies.[25]

MCI/WorldCom fails to account for the impact of depreciation on regulatory accounting earnings. In the past, AT&T correctly acknowledged that the current depreciation rules makes it inappropriate to measure productivity based on regulated accounting earnings. "In productivity studies capital is appropriately valued at its economic value. That value can differ substantially from book value, especially in regulated industries, where book depreciation is determined in a political process that may not reflect underlying economic conditions."[26]

This is clearly demonstrated in the many billions of regulated asset writedowns both AT&T and the incumbent price cap LECs have recognized on their SEC/GAAP financial statements. In addition, the Commission's productivity model calculates that BOC regulated depreciation rates average 7.3 percent. Recent Value Line reports indicate that AT&T's 1997 depreciation rate was 8.6 percent, and MCI/WorldCom's rate was 13.6 percent. It is clear that if

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[24]USTA Ex Parte Letter to Mr. William Caton, CC Docket No. 94-1, January 20, 1995.

[25]Even if EBITDA is examined, it does not support MCI/WorldCom's arguments. The EBITDA of incumbent LECs has not changed significantly from 1990 (before price cap regulation) through 1997 or from 1991(when price cap regulation was implemented) through 1997. The modest change in EBITDA for incumbent LECs is quite small in comparison to the change in EBITDA experienced by the Value Line 752 Industrials:

	Change in Percent EBITDA	
	1997 v. 1990	1997 v. 1991
Regulated BOCs + GTE	-0.2%	4.8%
Value Line 752 Industrials	16.1%	27.7%

[26]AT&T Comments, CC Docket No. 92-134 September 4, 1992 at Attachment p. 13.

the incumbent LEC's composite depreciation rate was only one percent higher, annual reported industry interstate earnings would be reduced by approximately 1.4 percent. This has at least two important consequences in this proceeding. First, IXCs and others have based much of their criticisms of price caps on regulated accounting earnings which are inflated by such uneconomic depreciation rules, an asymmetric regulatory burden on incumbent LECs. Second, anyone using financial statements to draw conclusions about productivity would get different answers depending on whether the financial statements were Part 32, jurisdictionally separated or on a SEC/GAAP basis.

AT&T, MCI/WorldCom and others claim that the imposition of the 9.2 percent X-Factor from 1995, is necessary to "correct" the incumbent LECs' earnings improvement under price caps. AT&T uses an economically meaningless interstate-only output adjustment to the Commission's model over the complete 1985 to 1995 period to derive its higher 9.2 percent X-Factor result. The wildly excessive nature of this 9.2 percent X-Factor is exposed if actual past interstate earnings were adjusted to reflect the impact of such a higher X.[27] The results of the additional revenue reductions from the high 9.2 percent X-Factor overlaid to past average industry earnings are dramatic. Returns well below LFAM occur in the second price cap year

[27] The record already provides ample evidence that an X-Factor of 10 percent applied since 1991 would have driven interstate price cap LEC returns down immediately by approximately 190 basis points each year, requiring recurring LFAM relief. USTA Ex Parte Letter to Ms. R. Keeney, CC Docket No. 94-1, April 30, 1996. Further, AT&T has previously filed evidence that the achieved X was 5.47 percent based on incumbent LEC interstate price cap earnings. USTA refuted this evidence by showing that AT&T's calculation was over one percent too high when corrected for errors. USTA Ex Parte letter to Mr. William Caton, CC Docket No. 94-1, March 16, 1995.

and LFAM would continue to be needed thereafter.[28] The price cap industry earnings that AT&T and MCI/WorldCom and others seek to recapture by starting the 9.2 percent X-Factor impact from 1995 never would have existed in the first place under anything like a 9.2 percent X-Factor. AT&T used to understand this point clearly, "....any attempt to eliminate or recapture the profits resulting from such higher efficiency would not only breach the promise of price cap regulation, but destroy the incentive to make the difficult decisions necessary to yield the additional efficiency gains in the first place."[29]

C. A High X-Factor Will Inhibit LECs' Abilities to Invest in the Network.

In Attachment B appended hereto, Dr. Larry Darby explains how Commission decisions that influence earnings, earnings growth, risk and pricing flexibility are particularly significant for both financial investors and managers of the affected firms' cash and capital budgeting processes. Price caps influence both the incentive and the ability of affected firms to invest and to take the risks associated with innovation of all kinds. Prescriptive measures leading to

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[28]The LFAM outcome from a 9.2 percent X-Factor is demonstrated as follows. A 9.2 percent X-Factor exceeds the actual 3.3 percent X-Factor adopted in 1991 by 5.9 percent. The extra revenue reduction from the 9.2 percent X-Factor would be reduced by an additional 5.9 percent of 1991 industry revenues, or about $1.12 billion. This amount would have been effective in July 1991 so that approximately half of this reduction, or $560 million, would reduce the industry's reported 1991 earnings. Thus, the 1991 average industry earnings would have been reduced from the actual 11.8 percent by 110 basis points to 10.7 percent, which is only 45 basis points above the 10.25 percent LFAM trigger. Incumbent LECs would bear the full annual effect in 1992. The total revenue reduction in 1992 would be $1.68 billion. This would reduce 1992 industry revenues by 3.3 percent or 330 basis points, well below the LFAM level. It is obvious that the additional annual recurring revenue reductions of over $1.1 billion associated with a 9.2 percent X-Factor quickly overwhelm actual industry earnings gains experienced from the X-Factors actually adopted and would result in the need for continuing LFAM adjustments.

[29]AT&T Comments, CC Docket No. 92-134, September 4, 1992 at 51.

changes in access charges will have a significant impact on both the incentives and abilities of different firms to invest in local facilities. As Dr. Darby explains, earnings provide the incentive to invest inasmuch as the purpose of business investment is to increase wealth or otherwise create value for shareholders. Current and future earnings are a main reason for investing and by reducing them, prescriptive rate cuts will reduce the expected value from additional investment in local facilities which will, in turn, reduce the incentive for incumbent LECs to invest. As Dr. Darby explains, revenue from access charges levied on interexchange carriers provides a substantial share of the revenues of incumbent LECs. These revenues cover not only the direct cost of providing interstate carrier access, but also contribute substantially to the cost of common plant and equipment used to make available services in other jurisdictions and to other users, residential users in particular. Changes in price caps will change the anticipated level of these revenues and, hence change investors' expectations about earnings derived from those revenue streams. He also notes that changes in price caps will also alter the other two determinants of share price — growth and risk. According to Dr. Darby, price cap changes will a) change investors' expectations about earnings growth and the ability of managers to grow earnings by increasing productivity and b) influence investors' estimates of both market risk and regulatory risk.

Dr. Darby describes the beneficial incentive effects of price caps and their positive influence on management to become more efficient and to invest more in local facilities as well as on shareholders to encourage management to do both. He warns that changing the price cap rules by increasing the productivity offset will create uncertainty among investors about future earnings growth and will increase the return they will require as a condition of holding

incumbent LEC securities. This will introduce disincentives for management to invest. Discouraging investment by reducing earnings is only one problem. Increases in the X-Factor will also discourage investment by increasing regulatory risk attributable to the inability of shareholders to forecast regulatory constraints on earnings. It will give investors mixed signals about whether carriers are under price cap regulation, rate of return or both. According to Dr. Darby, if managers are penalized by subsequent adjustments in the X-Factor both they and investors will adapt by disregarding the incentives theoretically embedded in the price cap scheme. The result will be a tendency toward lower efficiency, higher risk and reduced incentives for incumbent LECs to invest in local network access facilities.

Dr. Darby also analyzes the earnings data reported by AT&T and MCI/WorldCom and concludes that the data do not support their claims that access charges must be prescriptively adjusted. He explains that earnings measures derived from regulatory accounting data or from prescribed cost data are accounting fictions and that managers and investors are aware that Commission reported earnings levels are critically subject to the various assumptions which they unvariably reflect regarding rate of capital consumption and prescribed depreciation schedules. He cites specific instances where AT&T and MCI/WorldCom misrepresent and draw invalid conclusions about incumbent LEC earnings.

Clearly, the positions taken by AT&T, MCI/WorldCom and others seeking unjustified increases in the X-Factor for incumbent LECs is only meant to harm the ability of incumbent LECs to compete. The Commission should not adopt measures which would penalize incumbent

LEC efforts to become more efficient.[30]

D. The Commission Should Revise its Model to Reflect Significant Economic Variables.

At Attachment D appended hereto, Professor Gollop recommends changes in the Commission's productivity model to reflect significant economic variables which will impact the ability of incumbent LECs to achieve productivity gains in the future. First, Professor Gollop analyzes the reduction in RBOC employment levels, which decreased at an annual rate of 4.9 percent over the 1991 through 1995 period, but which have slowed considerably in both 1996 and 1997. TFP growth and, therefore, the X-Factor, are very sensitive to changes in employment levels. Updated data reveal that employment levels dropped only 2.5 percent in 1996 and increased at 0.04 percent in 1997. Dr. Gollop quantifies the impact of this slower rate of employment and concludes that if near-term employment levels decline at only half the rate from 1991 through 1995 or stabilize, the X-Factor should be from 0.4 to 1.0 percent lower.

Second, rate restructuring under access reform dramatically shifts revenue weights among interstate outputs and, therefore, the measured rate of growth in total company output. MCI WorldCom incorrectly claims that access revenues are growing "despite access reform".[31] MCI draws invalid conclusions based on inappropriate comparisons and a misrepresentation of the facts. Comparing minute growth to revenue growth is inappropriate. The facts are that, as a

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[30] Surely AT&T's recent announcement that its third quarter profits had increased 68 percent, resulting from cost cutting initiatives and stronger revenues from its wireless and business services, is further evidence that the market-based approach to access reform produces benefits.

[31] MCI at Attachment A.

result of access reform and growing competition, both usage growth and revenue growth are decreasing. MCI/WorldCom does not accurately portray the significant price reductions which occurred in July 1998. By including the 1998 price reductions, revenue growth would only be approximately 2.9 percent. In addition, as recovery of access is shifted from minutes of use to a flat rated per line and per trunk basis, it is reasonable to conclude that the rate of revenue growth will continue to decline even faster in the future.

In fact, Dr. Gollop's quantification reveals that access restructuring will, by itself, result in a two-tenths percentage point reduction in the X-Factor.[32] However, this only represents the impact of the restructure implemented on January 1, 1998. The impact of future restructuring will further lower the ability to achieve current productivity levels as the Commission continues to shift to the slower-growing line-based revenue recovery from the faster-growing minute of use basis of recovery.[33] The Commission's model does not include this effect.

Professor Gollop's study confirms that the high levels of productivity gains achieved in the early years of price cap regulation will not be sustainable in the future. Again, AT&T correctly acknowledged this point. "It is very possible that AT&T cannot maintain the efficiency gains and service innovations achieved during the period of price cap regulation. Principles of marginal gains suggest that the greatest opportunities existed at the outset...Because AT&T has already achieved the most significant and least costly gains, further advances will be more

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[32] USTA previously estimated this impact. USTA Comments, CC Docket No. 96-262, January 29, 1997 at Attachment 5.

[33] The PICC is scheduled to increase on July 1, 1999 and thus the per minute rates will be further reduced.

difficult to achieve...In sum, even if AT&T had experienced significant and unexpected productivity and profitability gains...which is not the case...there would be no basis to conclude that those gains would continue."[34]

That view was recently confirmed in a recent article by Mr. Kenneth G. Robinson. "One has the sense that many local as well as long distance companies have cut about as many workers as possible without starting to cut into customer service levels — not a good proposition just as markets are becoming more competitive."[35]

Quantifying such impacts is crucial to ensure that the price cap model operates optimally. In order to maintain the positive incentives of price cap regulation, all variables must reflect accurate economic reality. Even with a realistic X-Factor, switched access rates will continue to fall, investment in the infrastructure will be maintained and efficiency gains will continue to increase.

IV. USTA'S MECHANISM TO REDUCE AND ULTIMATELY ELIMINATE REGULATION WHEN COMPETITIVE TRIGGERS ARE MET SHOULD BE ADOPTED IMMEDIATELY.

A. Pricing Flexibility is a Necessary Component of Access Reform and the Pro-competitive, De-regulatory Telecommunications Policy Framework.

Many parties acknowledge the potential benefits in providing greater pricing flexibility to incumbent LECs. Ad Hoc supports the principles of pricing flexibility and agrees that a pricing flexibility mechanism should be adopted on an industry-wide basis to avoid a piecemeal waiver

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[34] AT&T Comments, CC Docket No. 92-134, filed September 4, 1992 at 49.

[35] Kenneth G. Robinson, "The Bells and the Long Distance Industry: Is a Merger Wave Ahead?" *TeleCompetition Report*, April 16, 1998 at p. 10.

approach and to acknowledge the fact that different characteristics of the markets for different services require different criteria, time frames and regulatory relief.[36] It specifically recommends the availability of contract-based pricing in competitive situations. Both MCI/WorldCom and Sprint support simplifying the criteria governing zone density pricing and Sprint further recommends that density zones should be expanded to apply to switched access elements.[37] Sprint also suggests that the interexchange basket should be removed from price cap regulation once 1+ intraLATA is available.[38] These recommendations reflect USTA's proposed Stage 1 regulatory relief.

AT&T complains that pricing flexibility would facilitate cross subsidy, predatory pricing and other anticompetitive schemes that AT&T apparently could not specify.[39] These complaints have been addressed in previous comments by Schmalensee and Taylor and Sidak and Spulber and they are purely speculative, motivated solely by AT&T's desire to prevent and/or hamstring incumbent LEC efforts to compete in the marketplace. These economists have discussed at great length the necessity of eliminating asymmetrical regulation once markets are first opened to competition in order to protect customers by encouraging efficient entry and sending the correct economic signals regarding pricing and service provision. In competitive areas, competition will provide adequate protection. In less competitive areas, regulations will continue to provide adequate protection. That is exactly why USTA and others have proposed that regulation be

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[36] Ad Hoc at 26-27.

[37] MCI/WorldCom at 58-59, Sprint at 2, 13-14.

[38] Sprint at 15.

[39] AT&T at 9.

reduced in stages and in specific locations or for specific customers. As the Commission itself points out, the ability to substitute UNEs for exchange access services once the competitor has won the customer, the inability of the incumbent LECs to recoup investment through anticompetitive acts and the availability of antitrust laws provide adequate protection against any such potential conduct. In addition, price cap regulation eliminates the ability to fund predation or cross subsidize.

In his reply, Dr. Taylor responds to the paper attached to AT&T's comments prepared by J.A. Ordover and R.D. Willig and observes that their principal argument, that regulation should result in lower prices for all customers, can be best accomplished through pricing flexibility. Low-volume customers or less dense areas of the country do not pay higher prices because of incumbent LEC volume and term discounts or contract prices: on the contrary, prices for other incumbent LEC services could be reduced for these customers or in these areas if flexible pricing permits the incumbent LEC to retain profitable business that it would otherwise have lost to a competitor. He notes that the Courts, the Commission, and economic analysis recognize this fact. Even AT&T agrees that "lowering prices in response to a competitor's offer in order to retain or attract business 'often is the very essence of competition,' and benefits consumers so long as prices remain 'above predatory levels.' That is true whether the price cuts are general or limited to specific customers."[40]

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[40]Reply Comments of AT&T, CC Docket No. 90-132 filed September 18, 1990 at 76-77 [footnotes omitted].

MCI/WorldCom claims that incumbent LECs do not fully utilize the limited flexibility currently permitted under the rules.[41] This argument has already been refuted on the record. To summarize, the current rules do not provide incumbent LECs with sufficient flexibility to adequately respond to competition and to ensure economic pricing. Zone density pricing is only permitted for a limited number of transport services where collocation is operational. The zones do not adequately reflect areas of competition. Some LECs have received special waivers of the rules granting additional flexibility. However, this process is burdensome and cannot be accomplished in a timely manner. The purpose of the trigger mechanism is to avoid such a piecemeal approach.

MCI/WorldCom also claims that incumbent LECs do not need pricing flexibility because current prices are at the cap.[42] Since incumbent LECs are not permitted to respond to competition, this argument doesn't make much sense as it seems to state that since prices are regulated, flexibility is not needed. It is unlikely that incumbent LECs would have willingly permitted the IXCs and the CLECs to win such a substantial number of large business customers if they could have prevented it under the current rules. Volume and term discounts, the ability to introduce new services, contract pricing, deaveraging of prices are all normal and healthy tools which all participants should be permitted to utilize, particularly in markets where customers have different needs for services. Preventing the incumbent LECs from structuring their prices or offering new services to supply these customers makes all customers worse off.

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[41] MCI WorldCom at 36-37.

[42] MCI WorldCom at 37, 43.

B. Competition is Sufficient and is Growing at Anticipated Rates.

The major disagreements regarding the adoption of a pricing flexibility mechanism appear to be over the competitive triggers.[43] Some parties complain that competition has not developed to sufficient levels, thus flexibility is not warranted.

USTA's proposal does not rely on potential competition, as at each phase customers must be utilizing alternative sources for regulatory relief to be granted. However, it has been stated and restated in this proceeding by Schmalensee and Taylor that potential competition cannot be ignored by the Commission. As explained by Dr. Taylor, by mandating the supply of UNEs and interconnection, the Telecommunications Act greatly reduced the magnitude of sunk costs that entrants into local exchange and exchange access markets must put at risk. Entrants can compete to supply complete packages of services, leveraging their current customer relationships into a full service package. In addition, the capacity of such carriers — which helps to determine the degree to which their services can substitute for incumbent LEC services — is frequently large relative to the market as measured by the proportion of customers, revenue, access lines or minutes that are addressable through the entrant's facilities combined with the unbundled elements of the incumbent LEC.

Economists have consistently maintained that flexibility should be granted when markets are first open to competition, not upon a showing of substantial competition. As Dr. Taylor explains, technical economic efficiency is fostered when all firms are permitted to offer services which reflect economic cost. If not, entry incentives will be distorted. CLECs will have even

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[43] AT&T at 9, MCI WorldCom at 64, Sprint at 12.

greater incentives to compete only for business customers in dense areas where service costs are low relative to the incumbent LEC's price and to continue to ignore residential and rural customers where costs are likely to exceed the incumbent LEC's regulated price. Such asymmetric competition leads to welfare losses.

The fact is that competition exists. For years, incumbent LECs have been providing the Commission with evidence of competition. There can be no question that competition is present and is growing.[44] The picture painted by commenting parties is not an objective representation of the environment under which incumbent LECs operate. For example, MCI/WorldCom and CompTel focus on absolute measures of competition, ignoring how the growth and concentration of competition has developed. Dr. Taylor observes that in less than two years, the incumbent LECs have lost as many customers as AT&T lost in eight years. Such growth exceeds expectations of a year ago.

Dr. Darby also notes that the assessments of parties claiming that competition does not exist or is not growing at anticipated rates is inconsistent with capital market views. He states that investments in competitive facilities and alternatives are being made at very substantial rates. From an investment incentive point of view, he notes that simple percentage point measures of loss of share of market revenues is not a very useful indicator of either the seriousness of past

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[44]*See*, Application of Teleport Communications Group, Inc., Transferor, and AT&T Corp., Transferee, for Consent to Transfer of Control of Corporations Holding Point-to-Point Microwave Licenses and Authorizations to Provide International Facilities-Based and Resold Communications Services, CC Docket No. 98-24, *Memorandum Opinion and Order*, FCC 98-169 (rel. July 23, 1998) at ¶¶ 23- 27 and Application of WorldCom, Inc. and MCI Communications Corporation for Transfer of Control of MCI Communications Corporation to WorldCom, Inc., CC Docket No. 97-211, *Memorandum Opinion and Order*, FCC 98-225 (rel. Sept. 14, 1998) at ¶¶ 162-187.

losses or their implications for expected payoffs of future investments. Given that the markets targeted by competitors are the high margin markets, revenue losses seriously understate the financial impact of past and future competition. Competition is ultimately about earnings, not revenue.

Dr. Darby states that, according to most telecommunications securities analysts, market forces are becoming increasingly pervasive and reliable as a means to disciplining LEC ratemaking processes. He relates compelling examples of analysts' views regarding the accelerated pace of CLEC market growth and the impact they predict such increased competition will have on incumbent LECs. He urges the Commission to be as forward-looking in its assessment of competitive prospects as it has been in its consideration of incumbent costs for regulatory purposes.

Price cap regulation was adopted because competition was not in place and the Commission concluded that price cap regulation more closely emulated a competitive market than traditional cost of service regulation. Now, to emulate market conditions with open entry and the presence of competition, regulation must change. Pricing flexibility must evolve as markets evolve. This is the purpose of the pricing flexibility plan proposed by USTA.

The triggers proposed by USTA are designed to rely on data readily available to incumbent LECs. This will reduce the need for burdensome reporting requirements for the CLECs and lengthy regulatory proceedings. The initial competitors are already known and operating: AT&T TCG, MCI/WorldCom, Sprint, Time Warner and other well-financed corporations such as PCS providers, cable companies and electric utilities. It is highly unlikely that these companies will be forced from the market by the incumbent LECs. These companies

can all offer complete bundles of local, long distance, data, wireless and other services. They can game the system by only serving the most lucrative customers. It is ludicrous to require that incumbent LECs lose 50 percent of market share in order to utilize contract pricing.[45] As described above, waiting for a showing of "substantial" competition will deny customers the full benefits of competition as entrants will be sent the wrong economic signals regarding prices and services. Delay will only make matters worse. The Commission should immediately adopt USTA's proposal.

V. CONCLUSION.

AT&T and MCI/WorldCom concoct economically meaningless arguments regarding interstate-only productivity and incumbent LEC accounting earnings to support their claim that access rates should be prescriptively slashed and/or that the X-Factor should be increased. These arguments have been rejected in the past and do not warrant further consideration. Prescriptive access reductions will impede competition, endanger universal service, prevent recovery of access costs and will not benefit residential or small business customers. Updating the record proves that the current 6.5 percent X-Factor is too high and must be reduced. In addition, the models should be modified to recognize the impact of employment levels and access restructuring to lower the X-Factor and to reflect the fact that future productivity gains will be more difficult to achieve. The incentives of price cap regulation should be maintained. Finally,

[45] MCI at 55.

the Commission should ignore claims that there is no competition for interstate access services. Clearly such competition exists, and the Commission should adopt USTA's mechanism to permit incumbent LECs to respond to that competition.

Respectfully submitted,

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November 9, 1998

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I, Donna Young, do certify that on November 9, 1998, copies of the accompanying Reply Comments of the United States Telephone Association were either hand-delivered, or deposited in the U.S. Mail, first-class, postage prepaid to the persons on the attached service list.

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I, Donna Young, do certify that on November 9, 1998, copies of the accompanying Reply Comments of the United States Telephone Association were either hand-delivered, or deposited in the U.S. Mail, first-class, postage prepaid to the persons on the attached service list.

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ATTACHMENT A

USTA REPLY COMMENTS
CC DOCKET NO. 96-262
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PRODUCTIVITY AND PRICING FLEXIBILITY: REPLY COMMENTS

by

William E. Taylor

NOVEMBER 9, 1998

Table of Contents

I. INTRODUCTION

1. My name is William E. Taylor. I am a Senior Vice President of National Economic Research Associates, Inc. (NERA), head of its telecommunications economics practice and head of its Cambridge office. I filed direct comments in this Docket on behalf of the United States Telephone Association ("USTA") on October 26, 1998 and have been asked to reply to some of the economic issues raised by other parties: in particular, the claims

- that interstate output growth should be used to estimate a target value of X (the productivity offset) in the price cap plan,
- that "the carrier access market is characterized by seriously distorted elevations of prices over costs" [1] and that access prices should be prescriptively reset to forward-looking economic cost,
- that access competition has progressed more slowly than anticipated so that prescriptive regulation of access charges is warranted, and
- that pricing flexibility is premature under current conditions and would lead to anticompetitive actions.

II. INTERSTATE TOTAL FACTOR PRODUCTIVITY GROWTH IS AN OXYMORON.

2. AT&T, MCI WorldCom and Ad Hoc decline the Commission's invitation to update and refresh the study used by the FCC to measure Local Exchange Carrier ("LEC") total factor productivity ("TFP") growth.[2] Instead, AT&T, MCI WorldCom and Ad Hoc urge the Commission to reverse its previous findings and base X on something they call "interstate

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[1] A. Ordover and R.D. Willig, "On Reforming the Regulation of Access Pricing," May 11, 1998, attached to "Comments of AT&T Corp. to Update and Refresh the Record," CC Docket Nos. 96-262, 94-1 and RM No. 9210, October 26, 1998, ("Ordover-Willig").

[2] Ad Hoc (at 24) gratuitously asserts that "updating the data series to reflect one or two years of additional data would not be expected to materially alter the average results given the strong LEC productivity growth trend during the period 1987 to 1991, and our preliminary analysis confirms this to be so." Ad Hoc's secret preliminary analysis appears to be contradicted by Professor Gollop's explicit update of the FCC's method (filed as Attachment D to USTA's Comments) which finds that the average X-factor in all three post-price cap periods (1991-1997, 1992-1997 and 1993-1997) is 4.5 percent or lower.

productivity growth."[3] AT&T proposes to measure interstate productivity growth by substituting interstate output growth for total output growth in the formula used by the Commission to measure the LECs' ("TFP") growth.[4] Ad Hoc and MCI WorldCom appear to concur in this calculation.[5] The calculation is economically meaningless and has no bearing on the rate at which interstate unit costs and prices could be expected to fall over time in the future.

A. Interstate TFP growth is not defined.

3. From an economic perspective, we have shown in the past that in the presence of common costs, TFP growth for a subset of the firm's services is not defined. Only in the case that the firm's production function is separable in those services—so that the marginal rates of substitution among interstate factors of production are independent of the levels of intrastate demand (and vice versa)[6]—can TFP growth for interstate and intrastate services be individually defined. There seems to be no debate concerning the lack of separability between interstate and intrastate services: MCI WorldCom, for example, cites the Commission as stating that interstate and intrastate services are usually provided over common facilities.[7] Why, then, do these parties persist in trying to measure and use in a price cap plan something which does not exist? The error in their reasoning is plain to economists, but it will help clarify the issue for non-economists to examine MCI WorldCom's incorrect but logical-sounding argument:

> The Commission itself stated that interstate and intrastate services are usually provided over common facilities. Since that is the case, it is reasonable to

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[3] AT&T Comments at 15-16; Ad Hoc Comments at 12-15, 20-25; MCI WorldCom Comments at 27-29

[4] AT&T Comments at 16-18 and Attachment C, "Statement of Dr. John Randolph Norsworthy Regarding Update Data in Response to the Commission's Public Notice of October 5, 1998" ("Norsworthy Statement").

[5] Ad Hoc Comments at 23; MCI Comments at 28-29

[6] See W.E. Taylor, T.J. Tardiff and C.J. Zarkadas, "Economic Evaluation of Selected Issues from the Fourth Further Notice of Proposed Rulemaking in the LEC Price Cap Performance Review," Attachment C to USTA Comments, December 18, 1995 at 16-17

[7] MCI WorldCom Comments at 27

> conclude that the growth of inputs is the same for the two jurisdictions.[8] Thus, if interstate outputs are growing faster than intrastate outputs, interstate TFP should be higher than total company TFP (at 26-27).

The first sentence is correct, but the second and third do not follow from it. There is no economically meaningful way to ascribe common costs to individual services, and TFP growth cannot be measured for individual services in the presence of common costs.

4. This problem is not a theoretical economic quibble. Prices in competitive markets characterized by common costs will move in predictable ways as output levels for individual services change, and one reasonable standard to use in setting a productivity offset is to emulate the movement of prices under competitive conditions. Suppose the regulated firm supplied only two identical services (interstate and intrastate usage) initially at equal volumes and equal prices, using identical facilities which could have both fixed and variable cost components. Suppose that over time, (i) demand for interstate usage doubled while demand for intrastate usage remained constant, and (ii) total input quantities increased by 40 percent. The resulting growth in TFP for the firm would be about 6 percent: aggregate output would have increased by about 46 percent while aggregate input quantities would have increased by 40 percent. Assuming input prices were unchanged, unit costs would fall by about 6 percent.

5. How should this productivity growth be distributed—if it all—between interstate and intrastate usage? First, it should be clear by the symmetry of the assumptions that the change in variable cost is the same for interstate and intrastate usage: an additional minute of each service would increase total costs by exactly the same amount both before and after the change in output. Even though interstate demand growth is responsible in this example for the reduction in unit costs, that reduction applies equally to interstate and intrastate services. In this example, it is cheaper to produce an additional unit of intrastate service at higher levels of interstate demand. Thus, if all costs were variable, unit costs for interstate and intrastate services would

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[8] AT&T implicitly assumes that the rate of growth of interstate inputs is the same as the rate of growth of total inputs for the firm: see Attachment C where a TFP-like growth rate is calculated from the difference between interstate output growth and total firm input growth.

fall by the same amount (6 percent), and—in unregulated competitive markets—output prices for these services should fall by about the same amount. Second, if all costs were fixed, incremental cost would be zero in each jurisdiction and each additional minute of use would reduce unit costs by the same amount, irrespective of whether the usage were interstate or intrastate. Thus, it is pointless to ascribe faster TFP growth to one service compared with another, when both services share common facilities.

6. A second example in which technological change drives productivity growth may be helpful. Suppose, again, there are only two services—interstate and intrastate usage—of equal size and both services use switches. Suppose asynchronous transfer mode ("ATM") switches reduce costs, and firms place ATM switches in their networks when it is cost-effective to do so. All else equal, if usage grows more rapidly, ATM switches will diffuse more rapidly throughout the network since where new switch capacity is required, ATM switches would be placed rather than digital. The more rapid diffusion of the new technology then leads to an increase in the rate of total factor productivity growth and in the rate at which unit costs for usage falls over time.

7. Now, the rate at which ATM switches are placed in the network depends on the growth in usage but not on the jurisdiction of that usage. For a traffic engineer, the need for additional capacity depends only on peak-period demand, not on whether that demand is interstate or intrastate. As a result, a firm whose interstate demand grew at 10 percent per year while its intrastate demand was constant would experience the same rate of introduction of ATM switches as an otherwise identical firm whose interstate and intrastate growth rates were reversed. Unit costs and—under competitive conditions—market prices for usage would fall more rapidly in both jurisdictions as output in either jurisdiction grows. Thus, growth in interstate usage leads to lower unit costs and lower prices equally for interstate and intrastate usage. MCI WorldCom's assertion—that dividing the common cost by interstate and intrastate outputs results in a bigger decrease in the average cost of the faster-growing output—is correct as a matter of arithmetic but wrong as a matter of economics. The technological change that is assumed to drive productivity growth in this example is induced equally by growth in interstate

or intrastate usage, and it reduces costs (and thus prices) for both the slow-growing and fast-growing services identically.

B. LEC economists have consistently urged state and federal regulators to base the productivity offset on measured TFP for all LEC services.

8. AT&T (at 18-19) asserts that in intrastate regulatory proceedings, LECs have "conced(ed) that LEC interstate-only productivity (*sic*) far exceeds LEC local, intrastate productivity." First, the only sense in which AT&T's citations contain such a concession is semantic: in using imprecise language to explain a technical concept, the cited economists and LECs talk about interstate productivity growth as if it existed as a separate and measurable entity. The positions taken in the cited state and federal price cap proceedings by these parties are entirely consistent: that TFP growth for the entire firm—not for a subset of services—should be the basis on which the productivity offset is determined in both interstate and intrastate jurisdictions.

9. Second, the citations generally explain why the interstate X value originally determined by the FCC is inappropriate for use in a price cap plan for intrastate services. Recall that the interstate value of the productivity offset (the X-factor) initially set by the FCC was not determined by a direct TFP study based on either interstate or total output. Rather, the initial interstate X for the FCC's price cap plan was set using the price method, averaging together the long run rate of growth of real prices for all telecommunications services (the Spavins-Lande method) and the short run rate of growth of carrier access prices (the Frentrup-Uretsky method). It is certainly correct that the factors cited by the LECs—rapid rate of growth of interstate carrier access output in the 1980s, reductions in switching and transport costs, the relatively high margin on access services, etc.—increased the value of X calculated by both the Spavins-Lande and the Frentrup-Uretsky methods. Thus, if the method used by the FCC in setting the interstate value of X were applied to the intrastate jurisdiction, the factors discussed

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Interim Report and Order in CC Docket No. 94-1 and Second Report and Order in CC Docket No. 96-262, FCC 97-159, ¶¶ 137-141, Adopted May 7, 1997.

by economists and LECs cited in Attachment B to AT&T's Comments would necessarily result in a lower measured productivity offset for intrastate services, as they claim.

10. Third, AT&T mistakenly suggests that two facts frequently cited by economists in these proceedings, namely:

- that growth in output leads to higher TFP growth for the firm, and
- that growth in high markup services contributes more to TFP growth than growth in low markup services

support its view that an identifiable interstate TFP growth exists and should be used in a price cap plan for interstate services. As Dr. Christensen carefully points out in the passages cited by AT&T,[10] both of these facts imply that TFP growth for the firm will be higher, not that TFP growth somehow defined for a high-growth or high-margin service will be higher than TFP growth for a low-growth, low-margin service. As shown in the two examples above, the facts that LEC interstate services are growing more rapidly and carry a higher margin than intrastate services do not imply that TFP growth for interstate services—somehow defined—would be higher than for intrastate services, that unit costs for interstate services would be falling faster than for intrastate services or that the appropriate X in a price cap plan would be higher for interstate services than for intrastate services.

III. Access Prices Should Not Be Prescriptively Reduced to Some Measure of Forward-Looking Economic Cost.

11. AT&T and MCI WorldCom assert that carrier access charges are "grossly inflated"[11] and that "the Commission should by regulation correct what the market has been unable to correct, by prescribing cost-based access rates in lieu of today's above-cost rates."[12] Oddly, neither

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[10] AT&T Comments at 19 and Attachment B

[11] AT&T Comments at [illegible]

[12] MCI WorldCom Comments at 24

party denies that access charges have been falling under the Commission's price cap plan or even that the rate of reduction of carrier access prices is somehow less than that contemplated in the Access Charge Reform Order. Rather, it would appear that because access prices are today above the interexchange carriers' ("IXCs'") perception of forward-looking economic cost ("FLEC"), they believe that the premise of price cap regulation has failed and prescriptive remedies are required.

12. All economists in this debate probably agree that economic efficiency would be enhanced by recovering costs from cost causers in the prices they pay, removing implicit subsidies from those prices, and where public policy concerns constrain first-best efficient pricing, making subsidies explicit, removing them from prices and recovering them through a competitively neutral mechanism as efficiently as possible. The IXCs' persistent plea to reduce carrier access charges is thus not incorrect as a matter of economics; it is simply one piece of the puzzle which cannot be treated in isolation from the others.

13. Despite the unique virulence and persistence of the IXCs' complaints, carrier access charges are not the only services whose prices support implicit subsidies for basic local exchange service. Prices for LEC toll services, business exchange services, vertical services and local usage all recover contribution to basic local exchange service in addition to recovering incremental and shared fixed and common costs. Moreover, there is no valid economic way to distinguish contribution that supports universal service from contribution that recovers other shared fixed and common costs of the firm. Thus, one cannot determine that the proportion of contribution in access charges associated with universal service support is greater or less than the proportion of contribution in toll or vertical services that supports universal service. All of these supporting services flow contribution to the firm, and there is no economic link between the source of a dollar of a contribution and the use to which that contribution is put.

14. Similarly, economic efficiency is reduced because prices for these services exceed incremental cost, just as efficiency is reduced because carrier access is priced above incremental cost. Indeed, because the market demand for carrier access is less elastic than that for toll, the efficiency loss from a given percentage markup of price over incremental cost is

larger for toll than for carrier access service. Hence, MCI's proposal to lower the access charges it pays first, namely that

> (t)he Hybrid Cost Proxy Model ("HCPM"), adopted by the Commission just last week, sizes the subsidy which can be removed from the access revenue requirements (at 26)

represents nothing more reasoned than naked self-interest. When the subsidy to universal service is correctly sized and replaced by an explicit, competitively neutral universal service fund, then the prices of carrier access service, along with toll, business exchange and vertical services must all be considered for rate reductions in order to achieve revenue neutrality.

15. In that rate rebalancing, two economic principles should be observed.

1. The price of each unit of service should equal or exceed the marginal cost of that unit of service. Each service price in the aggregate should not be set below the total service long run incremental cost ("TSLIRC") of the service, in order that no service be subsidized.

2. Markups of prices above incremental costs for different services should distort the relative demands for services as little as possible.

The first principle does not imply that the price for any service should be set prescriptively at its incremental cost, or even at incremental cost plus some arbitrary percentage markup for shared fixed and common costs. In unregulated competitive markets, shared fixed and common costs are recovered from infra-marginal services and customers as market pressures permit; the pattern of such recovery cannot be duplicated mechanically in a cost proxy model, simply adding 15 or 20 percent to incremental cost as if tipping a waiter.

16. One need look no further than the interexchange market to observe the complicated relationships between price and incremental cost in markets subject to competition. Using average revenue per minute ("ARPM") in place of price for the sake of (avoiding) argument, I noted in my direct comments that AT&T's ARPM for residential direct-dial domestic long

distance service averages about $0.20 per conversation minute.[13] Obviously business ARPMs are lower—though not strictly comparable because of term and volume restrictions—and it is reported that the prices AT&T charges for bulk services under long term contracts are as low as 1.5¢ per minute or less (or, about 85 percent off retail, net of access).[14] Carrier access charges for residential users average between $0.04 and $0.05 per minute and somewhat less for business customers who frequently use some form of direct access rather than Incumbent LEC ("ILEC") switched access services. A reasonable estimate of the forward-looking incremental costs of an IXC's network would fall between $0.01 and $0.02 per minute.[15] Residential long distance service is thus currently priced at more than three times incremental cost, and the contribution (price less incremental cost) per minute in residential interstate long distance service ($0.13 to $0.15 per minute) far exceeds the contribution per minute from business services, which may be as low as $0.01 per minute. Contribution in long distance prices also greatly exceeds the contribution in carrier access prices, which averages no more than $0.04-$0.05 per minute.[16]

17. From this pattern and size of markups of prices above incremental costs for long distance services, I reach two conclusions. First, the need to reduce carrier access prices prescriptively and immediately in the name of economic efficiency is grossly exaggerated. The welfare gains from reducing carrier access charges to economic cost are tiny compared with, for example, the potential welfare gains from reducing toll rates to economic cost. Second, the likelihood of error in measuring incremental costs and particularly in determining the amount of shared fixed and common costs that market conditions permit is substantial. The potential damage from

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W. E. Taylor, "Access Reform Again: Market-Based Regulation, Pricing Flexibility and the Universal Service Fund," Attachment A to the "Comments" of the United States Telephone Association in CC Docket Nos. 96-262, 94-1, 97-250 and RM 9210, October 26, 1998 ("Taylor Direct") at 13.

Merrill Lynch, "BellSouth AT&T Contract Reinforces the RBOC GTE Investment Case, June 20, 1996, reprinted as Appendix 5 to Telecom Services Bulletin, August 9, 1996.

Taylor Direct at 14, citing R.W. Crandall and L. Waverman, *Talk is Cheap*, Washington: The Brookings Institution, 1995, pp. 143-144.

Taylor Direct at 14, citing D. Kaserman, J. Mayo, M. Crew, N. Economides, G. Hubbard, P. Kleindorfer and C. Martins-Filho, "Local Competition Issues and the Telecommunications Act of 1996," prepared on behalf of AT&T, July 15, 1996, p. 27.

these errors includes the distortion of competition for exchange and exchange access services, discouraging efficient facilities-based competitors from entering to serve the exchange access market and expanding to supply local exchange services. Third, even if the incremental and appropriate shared fixed and common costs of access services in each market could be measured precisely, prescriptive pricing and return to cost-of-service regulation of carrier access services—even if done correctly—would be a regulatory step in the wrong direction. The Commission has correctly recognized the efficiency gains from price cap regulation and the detrimental effect on incentives to reduce costs and increase productivity from cost-of-service regulation. As competition, or even the threat of competition, increases, the harmful effects of cost-of-service regulation on customers increases. Because it made sense to adopt price cap regulation eight years ago, it continues to make sense today.

18. Finally, as I noted in my direct comments, access charge reform cannot even be contemplated in isolation from reform of the current universal service system. Access charges—along with rates for several other services—currently provide substantial implicit support to the universal service. The replacement of such implicit support by explicit support from a separate universal service fund—the cornerstone of universal service reform—would automatically allow subsidy elements to be removed from current access charges. Because of this fact, the level and structure of an explicit universal service fund and the relationship between the federal and state universal service funds is critical to any access charge reform proposal. Realizing the inherent linkages among the current system of interstate access charges, the current mode of supporting universal service, and the role of price cap regulation in disciplining access rates, the FCC has laid out a multi-phase plan of reform which ensures that elements of all three are coordinated as reform goes forward. Singling out access rates for prescriptive regulation would break a crucial link in this three-way chain and, in effect, disrupt the rest of that reform plan. While IXC interests may be well served by having access charges reduced prescriptively to cost before the coordinated reform plan has been implemented, other carriers, customers, and the future of telecommunications itself would undoubtedly be harmed by such a course of action.

IV. COMPETITION FOR EXCHANGE AND EXCHANGE ACCESS SERVICES IS GROWING AT ANTICIPATED RATES.

19. The IXCs assert that there is no substantial competition in the market for carrier access services and that, for various reasons, competition has developed less rapidly than anticipated when the *Access Reform Order* was written.[17] Ordover and Willig opine that

> UNE-based competition is off to a very slow start; each RBOC and the other ILECs still have a virtual monopoly on the general provision of local exchange services—including access—and their monopolies are being eroded much more slowly than anticipated (at 5).

These parties argue that until widespread and substantial competition emerges, there should be no practical changes to the ILECs' pricing flexibility. In fact, they recommend that the ILECs' X-factor be increased substantially to reduce access charges that they believe would come about under a more competitive exchange access market structure.

20. There is a fundamental flaw in this logic. The underlying purpose of price cap regulation is to control the regulated firm's ability to exercise market power without incurring the reduced incentives to increase technical and dynamic efficiency that characterize traditional rate-of-return regulation. Price cap regulation is also more compatible with competition than rate of return regulation, because price cap regulation provides no opportunity to recover competitive losses from less competitive services, customers or geographic areas. Irrespective of the level or growth in competition, price cap regulation is thought to be a more efficient regulatory mechanism for controlling prices without discouraging cost reductions, investment, efficiency gains or marketing services to customers. However, price caps are not intended to increase the level of competition in exchange access markets. Therefore, if one believed that more competition in the markets for exchange access was desirable, it does not follow that changes in access charges or in the price cap plan are required.

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[17] See MCI at 7, AT&T at 3, Ad Hoc Telecommunications Users Committee at 3.

21. Drs. Ordover and Willig appear to confuse the cure with the disease. In enunciating their two "primary" objectives of regulatory policy, they state that

> (i)n today's real access marketplace, the primary objective of regulatory policy should be to foster competition in the provision of access, along with local exchange services, and to promote across-the-board, major reductions in access rates to the level of economic costs (at 4).

Surely Drs. Ordover and Willig do not believe that major reductions in ILEC access charges will foster competition in the provision of access and local exchange services. From their perspective, presumably other tools are necessary to encourage local exchange competition, but it is an inescapable economic fact that major reductions in ILEC access charges will make entry into the local exchange market less profitable for Competitive Local Exchange Carriers (CLECS), Competitive Access Providers ("CAPS") and IXCs rather than more. It was the incentive to compete against $0.17 per minute access charges that gave birth to the CAP industry almost fifteen years ago. The business case today for entry against $0.04 per minute access charges is nowhere near as compelling as it used to be, and to compete in the future against ILEC access charges set at the IXCs' view of FLEC would no doubt be suicidal.

22. Increasing competition was also not a goal of the Commission's *Access Reform Order*. Rather, the goal of the Order was principally to increase allocative efficiency by restructuring the recovery of interstate access costs, shifting recovery of non-traffic sensitive costs from usage-based to flat-rate charges. Thus, perceived lethargy in the growth of competition does not represent a failure of either the *Access Reform* or the *Price Cap* Orders.[18]

23. Since the primary purpose of price caps is to constrain ILECs from exercising market power in the exchange access market, it is wholly appropriate and economically necessary that regulations constraining ILEC pricing be reduced as the ILECs' abilities to affect market prices decrease. Price cap regulation is not a static mechanism that should remain unchanged until the

[18] *In the Matter of Price Cap Performance Review for Local Exchange Carriers and Access Charge Reform*, Fourth Report and Order in CC Docket No. 94-1 and Second Report and Order in CC Docket No. 96-262, released May 21, 1997, ¶¶ 150 ("Price Cap Order").

day that all vestiges of ILEC market power are eliminated. To emulate market outcomes under competitive conditions, ILEC pricing flexibility must evolve as markets evolve. Asymmetries must be removed as soon as markets are opened to competition, and price controls should be removed when customers have sufficient alternatives that the ILEC cannot exercise market power.

24. While there is legitimate debate as to the magnitude of exchange access competition, there can be no question that competition has taken root and is growing, compared to the time when price caps were introduced. To ensure that there are minimal regulatory distortions, ILEC regulation must change and adapt as well. It is precisely for this reason that USTA has proposed a transition mechanism that provides changes in the way the ILECs are regulated as certain objective triggers are met. These triggers correspond to benchmarks of actual and potential competition and provide a practical means of matching regulatory constraints with conditions in the marketplace.

25. In fact, the picture of competition painted by the IXCs in this proceeding is not an objective representation of the environment in which ILECs operate. The IXCs concentrate on absolute measures of competition, ignoring the speed at which competition is growing as well as the intensity and concentration of the competition in major, high density urban areas. Irrespective of the actual level of competition in access markets, competition is growing faster than anyone expected at the time of the passage of the Telecommunications Act or the release of the *Access Reform Order*. By the end of 1998, the market share of the CLECs as a group will reach 4 percent, so that in less than two years, the ILECs have lost (on a percentage basis) as many customers as AT&T lost in more than 8 years.[2] Moreover, because entrants target particular groups of high-usage, high-margin customers and ignore less attractive customers, a market

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"CLECs Surpass Bells in Net Business Line Additions for First Time (UH)," Salomon Smith Barney (JV Grubman) May 6, 1998.

MCI began offering toll long distance service in 1974, by 1982 AT&T's market share of toll revenue was 96.5 percent; see Robert W. Crandall, *After the Breakup: U.S. Telecommunications in a More Competitive Era* Washington D.C.: The Brookings Institution 1991.

share analysis based on revenues or capacity would show greater competitive losses than one based on share of customers.

V. ADDITIONAL PRICING FLEXIBILITY IS A NECESSARY, PROCOMPETITIVE COMPONENT OF ACCESS REFORM.

26. AT&T complains that pricing flexibility for carrier access services would "simply facilitate cross-subsidization, predatory pricing and other anticompetitive schemes," (at 9) suggesting that

> geographic deaveraging [of access charges] would "permit an ILEC to keep rates at supracompetitive levels in lower density areas where competition has not emerged, and to use those revenues to subsidize predatory pricing in high density zones where there is some competitive entry (A&T Comments at 9).

MCI WorldCom generally concurs in this complaint, claiming that

> (p)remature pricing flexibility would permit the incumbent LEC to reduce access charges selectively in order (*sic*) deter new entrants, while continuing to charge above-cost access charges in areas and for services where there are no competitive forces (MCI WorldCom Comments at 36).

The opposite conclusion was reached by the Commission in its *Access Reform Order*, where it acknowledged that

> giving incumbent LECs increased pricing flexibility will permit them to respond to competitive entry, which will allow prices to move in a way that they would not have moved were the pricing restrictions maintained. This can lead to better operating markets and produce more efficient outcomes.[2]

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[2] *In the Matter of Access Charge Reform; Price Cap Performance Review for Local Exchange Carriers, Transport Rate Structure and Pricing and End User Common Line Charges*, First Report and Order, CC Docket Nos. 96-262, 94-1, 91-213, and 95-72, released May 16, 1997 ("*Access Reform Order*"), at ¶270, citing J-J Laffont and J. Tirole, "Creating Competition Through Interconnection: Theory and Practice," *Journal of Regulatory Economics*, Vol. 10 (1996), pp. 227-256.

27. As Dr. Schmalensee and I have discussed at great length,[22] once markets have been opened to competition—before any showing of "substantial" competition could be made—regulatory asymmetries between entrants and incumbents should be eliminated, consistent with the need to protect customers against the exercise of market power. Otherwise, entrants are sent incorrect signals regarding prices and services, and customers are denied the benefits of price competition. MCI WorldCom, on the other hand, would prevent ILECs from providing services under contract tariffs (in competition with MFS and Brooks Fiber among others) until the ILEC demonstrates the presence of "substantial competition."[23] Opposing this view, the IXCs raise the specter of "selective" access charge reductions and the possibility that the ILEC will price supra-competitively in low density areas and use the revenue to subsidize predatory prices in high density areas where competitors are considering entry.

A. Pricing flexibility does not imply anticompetitive pricing.

28. The IXCs are quick to claim that pricing flexibility in the absence of sufficient competition would lead to cross-subsidization, predatory pricing and other anticompetitive actions, presumably including vertical price squeezes. However, broadly restricting the ILEC's pricing flexibility to prevent below-cost pricing for specific services is a costly and poorly targeted mechanism to address a comparatively simple problem. As the Commission discussed in its *Access Reform Order*, it has in place "adequate safeguards" against such conduct, citing its separate affiliate rules (at ¶¶278-279), the substitution of unbundled network elements for exchange access services (¶280), the LECs' inability to recoup investment in anticompetitive acts (¶281) and the adequacy of the antitrust laws (¶282).

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[22] See R. Schmalensee and W. Taylor, "The Need for Carrier Access Pricing Flexibility in Light of Recent Marketplace Developments: A Primer," Attachment to "Comments" of the United States Telephone Association in CC Docket No. 97-250, March 18, 1998.

[23] "Substantial competition," to MCI WorldCom, requires "a comprehensive analysis of competitive conditions" (at 54), a loss of 50 percent of market share measured by revenue or 50 percent of the channel terminations between end offices and customer premises (at 55) and a demonstration that the ILEC is supplying unbundled elements including a path between the end office and the customer premises at forward-looking economic cost and in "sufficient quantity" (at 57). After such a showing, the Commission would act on the ILEC's petition within one year (at 57).

29. In addition, a direct solution to such potential problems is to place incremental cost price floors under services subject to competition. Such cost-based price floors directly prevent anticompetitive pricing without the adverse unintended consequences of cost accounting, non-structural separations or mechanical constraints on pricing.[24] Moreover, because ILECs are required to supply wholesale versions of the retail services priced at avoided cost, price floors for ILEC retail services are effectively redundant. As the Massachusetts Department of Telecommunications and Energy recently observed, because the price of each wholesale service is set at an avoided-cost discount from the retail service price, each retail service price would automatically satisfy the price floor test: an efficient competitor would always be able to compete successfully against the ILEC's retail price—no matter how low the price was set—by reselling the ILEC's retail service.[25]

30. Economic theory also suggests that additional pricing flexibility is unlikely to lead to anticompetitive pricing for carrier access services. The anticompetitive pricing tactics listed above have two elements in common: they are strategies to discourage entry or induce the exit of competitors and, to be profitable, they require that an investment in forgone profits can be recouped through the future acquisition and maintenance of market power.[26] The latter requirement is unlikely to hold in local telecommunications markets in which high capacity optical fiber networks provide a wide range of services other than exchange or exchange access services, and whose capital costs are largely sunk.

31. In addition, the types of pricing flexibility required by the ILECs do not make anticompetitive pricing behavior more likely. Pure price cap regulation removes the ILEC's ability to fund predation or cross subsidization from prices of other services. Services

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[24] See R. Schmalensee and W. Taylor, "Comments on the USTA Pricing Flexibility Proposal," Attachment 4 to the *Comments of the United States Telecommunications Association*, CC Docket No. 94-1, May 9, 1994.

[25] Commonwealth of Massachusetts Department of Public Utilities, *Order on Motion for Reconsideration and Clarification of Bell Atlantic*, D.P.U. D.T.E. 94-185-C, December 17, 1997 at 11.

[26] A firm engaged in predatory pricing or cross-subsidization forgoes profit in the subsidized market by pricing below incremental cost. A price squeeze reduces profits for the firm because it forgoes the higher contribution it could earn from the provision of access by selling at too low a price in the retail market.

determined to be subject to competition (in Phase 3) would be removed from price caps, so that the ILEC would gain no additional ability to raise prices in less competitive geographic areas beyond that provided by ordinary price cap regulation. Similarly, revenues included in contracted services would be removed from the price cap mechanism. Hence, there is no sense in which anticompetitive price reductions in one area are being subsidized or funded by price increases in less competitive areas. Indeed, since services subject to competition would likely face price reductions, the fact that these services and revenues would be removed from price cap regulation leaves customers of other services better off because their price reductions would no longer count against the annual price reduction necessary to meet the price cap index constraint.

32. On the other hand, the IXCs' concerns appear to exceed the simple requirement that ILECs not price below cost for carrier access services. Rather, AT&T and MCI appear to wish to prevent the ILEC from targeting otherwise benign price reductions to particular customers or geographic areas, requiring that price reductions to meet competition be spread over all customers and all geographic areas. Such a requirement would be anti, not pro-competitive. The Courts, the Commission and economic analysis all recognize that permitting a firm to reduce or restructure prices to retain particular customers or service volumes that it would otherwise lose to competitors will generally result in lower prices for all consumers, provided that all services are priced above incremental cost. Low-volume customers or less dense areas of the country do not pay higher prices because of ILEC volume and term discounts or contract prices; on the contrary, prices for other ILEC services could be reduced if flexible pricing permits the ILEC to retain profitable business that it would otherwise have lost to a competitor. As explained by AT&T:

> In all events, the competitors' claim that single-customer offers are predatory is wrong, and the result they seek is antithetical to the Commission's procompetitive policies. The Supreme Court has held that lowering prices in response to a competitor's offer in order to retain or attract business "often is the very essence of competition," and benefits consumers so long as prices remain

> "above predatory levels." That is true whether the price cuts are general or limited to specific customers.[27]

Volume and term discounts and contract pricing and service configurations are normal and healthy consequences of competition in markets where customers have widely different needs for services. Preventing a large competitor from structuring its prices and services to supply these customers makes all customers worse off.

33. On behalf of AT&T, Ordover and Willig acknowledge the fact that "there are many circumstances in which customer-by-customer pricing flexibility facilitates competition and customer welfare," but argue that because carrier access prices exceed costs, "the main objective of regulation ought to be to reduce prices to all customers rather than to a small subset of individual customers."[28] This reasoning does not support the conclusions that Ordover and Willig draw. First, as discussed above, access charges are set above forward-looking incremental cost but by no larger a margin than contained in interstate residential direct-dial long distance prices. If high long distance margins did not detract from AT&T's argument in 1990, current access margins should not cause that argument to be reversed when applied to the access market. Second, the economic logic quoted by AT&T above is that by preserving the ability of the regulated firm to compete for profitable customers, prices to all customers—those who purchase services by contract and those who don't—can be made lower than they otherwise would be. Hence Ordover and Willig's asserted main objective of regulation—lower prices to all—is better served by permitting flexible responses to customers' requests.

34. Ordover and Willig assert that Dr. Schmalensee and I ignore the fact that ILECs can reduce their prices to all customers and focus instead on the "competitive harms from regulation-imposed rigidity of prices that the ILECs can charge to individual customers while charging

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Reply Comments of American Telephone and Telegraph Company, CC Docket No. 96-132, September 18, 1996 at 76-77 (footnotes omitted).

[28] J.A. Ordover and R.D. Willig, "On Reforming the Regulation of Access Pricing," (May 11, 1998) Attachment to the AT&T Comments, ("Ordover-Willig"), at 7.

higher price (*sic*) to all others."[29] While it is true that ILECs can compete by reducing prices across the board, CAPs, CLECs and IXCs, of course, can compete by tailoring service offerings to the needs of particular customers and are under no obligation to reduce their prices across the board in response to a competitive proposal from a large customer. Moreover, Ordover and Willig are incorrect in (at least one interpretation of) their assertion that pricing flexibility will result in a "higher price to all others." The price controls that the ILEC faces with respect to its non-contract customers are unchanged by pricing flexibility; by taking contract services out from the price cap, non-contract customers cannot bear any of the cost the ILEC incurs to compete for high-volume customers.

35. In less regulated, more competitive markets, not all customers and services pay the same price or receive the same price reductions as competitors focus their attention on particular service, customer or geographic market niches. Neglecting this fact, Ordover and Willig assert that if "competition were pervasive and ILEC prices too high for competitive success, then the ILEC should be able profitably to lower its prices to all customers." (at 7).[30] First, this assertion ignores the geographic and customer averaging of prices imposed by regulation. Some access prices today exceed what their level would be in unregulated competitive markets while others fall below this competitive level. Requiring across-the-board responses to competition would prevent competitive forces from ever aligning prices and costs as they would be under unregulated competitive conditions. Consider, once again, the interstate long distance market. Contract prices for business customers with volume and term commitments are an order of magnitude smaller than average residential prices, and average long distance prices for business customers have fallen much faster than for residential customers. If AT&T had been required

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Ordover-Willig at 7.

The point is repeated at 11: "Finally, and most important, ILECs are free to respond to price offerings made by their rivals. In particular, ILECs can readily meet competitive offerings with across-the-board price cuts, which would benefit telecommunications consumers. . . ." ILECs are "free" to respond to competitive offerings in the same way that I am "free" to pay my taxes. In markets open to competition with prices averaged across geographic areas and customers, Ordover and Willig's "freedom" will preclude meaningful price competition and eviscerate the benefits that customers expect to see from competition.

to lower all prices in order to respond to Requests For Proposals ("RFPs") from large corporate customers, the pattern of prices across the market would be very different.

36. Second, telecommunications markets are opened to competition, and technical economic efficiency is fostered when firms compete by offering prices as close as possible to the incremental cost of supplying service. If entrants but not incumbents are free to price contract services for large business customers closer to cost, entry incentives will be distorted: CLECs and CAPs will have even greater incentives to compete for business customers in dense areas where service costs are low relative to the ILEC's price and to ignore rural customers where costs are likely to exceed the ILEC's regulated price. Such asymmetric competition leads to welfare losses and—for no other reason—the constraints on pricing flexibility in the presence of geographically averaged prices and free entry should be lifted. Ordover and Willig's argument (at 11) that competitive losses for special and dedicated access do not create financial difficulties for the ILECs entirely misses the point. The loss in efficiency does not stem from financial harm to incumbents but rather from the continued presence of high-cost entrants supplying lower-than-average cost services to customers and geographic areas that are relatively inexpensive to serve. Entrants can choose which customers, services and geographic areas to enter, while, without pricing flexibility, ILECs are constrained to offer averaged prices.

B. Basic economic principles continue to apply to the carrier access market.

37. Ordover and Willig apparently concede that at least in some markets, application of the basic economic principles that Dr. Schmalensee and I discuss would lead to increased efficiency. In particular, in a

> market, unlike that for local access, in which prices have been held by regulation in alignment with overall costs, in which new demand and competitive supply circumstance might warrant some readjustments in the relative levels of these prices, and in which the extant regulatory mechanisms impede timely and efficiency-enhancing rate rebalancing that the regulated firm wishes to implement (Ordover-Willig at 2)

pricing flexibility would apparently be welfare-enhancing. However, Ordover and Willig go on to assert that the "fundamental flaw" in our analysis is the

> unstated assumption that access rates are already aligned overall with the efficient level of costs of providing access, and that provision of significant portions of access is already highly competitive, or will become so in the near future (Ordover-Willig at 3)

with which they appear to disagree. Moreover, when regulated prices are set above cost, Ordover and Willig assert that the world is turned upside down: that "the price movements needed to enhance economic efficiency require regulatory reforms that would tighten—rather than loosen—constraints on prices" (Ordover-Willig at 3).

38. There are three problems with this argument. First, it is premised on a naive and simplistic view of the facts of the access market. As discussed above, carrier access rates are no more out of alignment with incremental cost than any other set of prices in markets where a large portion of costs are shared fixed and common. In particular, carrier access rates are closer to FLEC (both absolutely and relatively) than were AT&T residential long distance rates when AT&T's long distance service was declared non-dominant. In addition, regulated access prices are averaged geographically and across customers, artificially generating entry in urban business markets and suppressing competition in high-cost residential areas. It certainly appears likely that "the extant regulatory mechanisms impede timely and efficiency-enhancing rate rebalancing that the regulated firm wishes to implement." Finally, actual and potential competition constrain ILEC carrier access prices differentially for different customers, services and geographic areas. In those market niches where customers do not currently have competitive alternatives, customers would continue to be protected from the exercise of market power by price caps. For services like special access, because the bulk of market demand is purchased by a small number of carriers each served by the ILEC throughout its geographic areas, customers are protected everywhere from the exercise of market power in any area.

39. Second, the argument ignores the role of potential competition. By mandating the supply of unbundled network elements and interconnection, the Telecommunications Act greatly reduced

the magnitude of the sunk costs that entrants into local exchange and exchange access markets must put at risk in order to enter. Entrants can now compete to supply complete packages of telecommunications services, leveraging their current customer relationships (e.g., with long distance, cellular or cable customers) into a full service package. In addition, the capacity of such carriers—which helps determine the degree to which their services can substitute for ILEC services—is frequently large relative to the market as measured by the proportion of customers, revenue, access lines or minutes that are addressable through the entrant's facilities combined with the unbundled elements of the ILEC.

40. Third, the conclusion doesn't appear to follow from the assumptions. Assuming, *arguendo*, that prices deviate from cost and actual and potential competition cannot prevent the exercise of market power, it still does not follow that our

> arguments and recommendations are up-side-down for today's access service and should be shelved until market events or FCC policy changes make them conform to reality (Ordover-Willig at 3).

Why does greater reliance on market forces combined with overall price cap regulation not lead to welfare gains rather than welfare losses? Ordover and Willig apparently believe that because "mere rebalancing" of access charges is not enough and that overall price reductions are necessary, pricing flexibility will somehow deny "the broad access market the benefits of across-the-board reductions in prices towards costs" (at 2 and 8). On the contrary, suppose ILECs faced no effective competition and were permitted to change access rates however they pleased. At current access prices, profits would surely increase if the (hypothetical) ILEC were to reduce per-minute carrier access charges and increase per-subscriber prices. While the level of access prices in this example would be inefficiently high, it should be clear that market forces—even where competition does not control market power—can push prices in an efficiency-enhancing direction. This effect can be important where regulation has constrained prices artificially through geographic, service or customer averaging; pricing flexibility combined with price cap regulation can undo inefficient and costly pricing patterns that discourage competition where it is least developed. While there may be special circumstances

under which pricing flexibility combined with initial prices above cost can produce welfare losses, there is no apparent economic reason why that should be the case.

41. Ordover and Willig argue that when prices generally exceed their competitive market level, voluntary, profit-seeking changes in prices will probably not correct the overall level of prices. However, that observation does not pertain to the pricing flexibility proposals that Dr. Schmalensee and I discussed, or to the proposal sponsored by USTA in this proceeding. Where competition is insufficient to check the market power of the ILEC, prices for customers without competitive alternatives remain under price cap regulation, while prices for customers issuing RFPs are permitted to compete in the market. To parody Ordover and Willig's argument, they appear to urge that pricing flexibility be denied in markets where regulated prices deviate considerably from costs, so that only where regulators have kept prices roughly aligned with costs—where pricing flexibility is unnecessary to align prices and costs—would pricing flexibility be permitted.

ATTACHMENT B

USTA REPLY COMMENTS
CC DOCKET NO. 96-262
NOVEMBER 9, 1998

Statement of

Dr. Larry F. Darby
Darby Associates – Washington, DC

Response to Comments in CC Docket No. 96-262

Accompanying
United States Telephone Association Reply

November 9, 1998

Introduction

My name is Larry F. Darby. I am a consulting economist and financial analyst focused on matters at the interface of information technologies, markets and regulation. For the past ten years I have specialized in analyzing the effects of regulation on capital formation and innovation in telecommunications and related industries. I have published several articles on the general subject. I have been Chief of the Common Carrier Bureau of the FCC, Chief of its Economics Division, as well as Vice-President in the Shearson-Lehman Investment Banking Group. I now head Darby Associates, a Washington based consulting practice. I am a Visiting Fellow at the Economic Strategy Institute, Adjunct Professor in the Telecommunications Program at the George Washington University Graduate School – where I teach Telecommunications Finance – and Advisor to CompassRose International. Details of my credentials are appended.

The purpose of this statement is to respond to certain contentions and recommendations included in responses to the Commission's Public Notice FCC 98-256. The Commission there invited parties' comments to update and refresh the record in matters related to interstate access charge reform, price cap performance for local exchange carriers, and related petitions filed by MCI and the Consumer Federation of America, et. al.[1]

My responses will focus on initial comments that relate to the effects of access charge reform on the incentive and ability of incumbent local exchange carriers (ILECs) and others to invest in local exchange facilities used to provide interstate, interexchange access and other services. The comments below commence with a brief overview of the importance of FCC regulated charges for access services on investment in infrastructure, then proceed to make the following basic points:

- Investment is influenced by ILEC X-factors, price caps, and earnings;
- Price cap regulation is working;
- Access charge reductions will reduce ILECs' investment abilities and incentives;
- Regulatory earnings data do not support lowering access charges;
- Earnings transfers from LECs to IXCs will discourage CLEC investment;
- IXCs are financially healthy; and,
- Financial and competitive market assessments by Wall Street securities' analysts contradict the characterizations of commentors.

Much of the analysis set forth below is standard fare in traditional corporate finance and investment theory. However, in view of the their importance in this proceeding and the fact that much of what was included in initial comments is inconsistent with these elementary principles, it is worthwhile to highlight basic elements of why firms invest and what impact FCC rules influencing important revenue streams will have on their ability and incentive to do so.

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[1] *In the Matter of Access Charge Reform*, CC Docket no. 96-262; *Price Cap Performance Review for Local Exchange Carriers*, CC Docket No. 94-1; *Emergency Petition for Prescription of MCI Telecommunications Corporation*, CC Docket No. 97-250; and *Petition for Rulemaking of the Consumer Federation of America, International Communications Association and National Retail Federation*, RM-9210.

Investment Is Influenced Significantly by ILEC X-Factors, Price Caps and Earnings

The Competition Policy Institute urges the Commission to increase the X-factor in LEC price cap calculations and use the results to prescribe lower access rates. It does so in part based on a subsidiary conclusion and recommendation that "the Commission should reject the broad assertion that the X-factor impedes investment activity of the ILECs."[2] The Institute provides no proof or even a casual basis for concluding that the X-factor has no bearing on ILEC investment activity. The reason is clear-cut. There is no basis for such a conclusion.

Regulation matters to telecommunications investment. It matters substantially. And, it matters in identifiable ways.[3] FCC regulations that impact earnings, earnings growth, risk and pricing flexibility -- all matters in play in this proceeding -- are particularly influential on both financial investors in company securities and managers of the affected firms' cash and capital budgeting processes. Prescriptive measures leading to changes in access charges will have a significant impact on both the incentives and abilities of different firms to invest in local facilities.

Price caps -- their existence and form as means of regulatory constraint on rates, and the methods, frequency and reasons for changing them -- influence both the incentive and the ability of affected firms to invest and to take the risks associated with innovation of all kinds. The productivity offset has a direct effect on the ability of firms to invest, but just as important -- and frequently ignored -- is the discouraging effect of unpredictable and episodic regulatory changes in the productivity offset in response to carrier success in meeting previous targets.

For given market and technological conditions, price caps constrain the ability of firms to invest by their influence over the pool of cash -- earnings -- available to underwrite investment. While investment may be funded by resort to external financing, the bulk of investment by mature companies, like the LECs and large IXCs, has in recent years been funded by cash accrued or earnings retained from current operations.

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[2] Competition Policy Institute in Response to Public Notice FCC 98-256, filed October 26, 1998, p. 10. Most of my comments will be directed toward refuting this simple assertion and in support of the directly contradictory conclusion expressed by a prominant Wall Street analyst: "Regulation of telecommunications is and should continue to be one of the most significant drivers of investment returns in the sector..." Eric Strumingher, "Regulatory Issues on the Front Burner", Paine Webber, (p. 2).

[3] Links between regulation, capital formation and innovation have been explored in several places. See, Larry F. Darby, "Regulation is a Key Determinant of Investment and Efficiency in Telecommunications", Capital Formation: The Forces that Influence Investment, Telecommunications Reports Journal, vol. 1, no. 2, Sept.-Oct. 1997, pp. 1-10; Larry F. Darby and Joseph P. Fuhr, Jr., "Telecommunications Capital Formation, Regulation and Economic Development", New Telecom Quarterly, v. 2, no. 3, (August, 1994), pp. 45-52; Larry F. Darby and Joseph P. Fuhr, Jr., "Impacts of the 1996 Telecommunications Act on Investment and Innovation", New Telecom Quarterly, 2Q 97, pp. 21-30; Larry F. Darby, "Perspectives on Investment and Innovation in U.S. Telecommunications", Statement accompanying testimony of Economic Strategy Institute, Hearings on Section 706 of the Telecommunications Act of 1996, Communications SubCommittee of the U.S. Senate Commerce, Science and Transportation Committee (April 22, 1998).

But more important than the impact of price cap changes and earnings effects on the ability of firms to invest is their influence on the incentives of firms to invest. The form of the price caps constraint -- the X-factor in particular -- will affect earnings, their growth and the risk investors associate with them. Each of these financial indicia of different investment options and outcomes are known to effect the level, composition and pace of investment. In making investment and capital budgeting decisions, managers are responsive to determinants of shareholder value, which is in general a positive function of earnings and growth and a negative function of risk.[4]

Earnings provide the incentive to invest inasmuch as the purpose of business investment is to increase wealth or otherwise to create value for shareholders.[5] Current and future earnings are a main reason for investing and by reducing them, prescriptive rate cuts will reduce the expected value from additional investment in local facilities which will, in turn, reduce the incentive for LECs to invest. Owners and managers alike have numerous alternative investment opportunities available to them. Investment in local telephone exchange facilities to provide interstate access must compete for available funds and vie with other projects or investment alternatives available to regulated firms. Lowering expected values from investing in local networks will lower such investment in the ranking of alternatives.

Revenue from access charges levied on interexchange carriers provides a substantial share of total local exchange telephone companies' revenues. These cover not only the direct cost of providing interstate carrier access, but also contribute substantially to the cost of common plant and equipment used to make available services in state jurisdictions and to other users -- to residential users in particular. Modifications to price caps will change the anticipated level of these revenues and thereby change investors' expectations about earnings.

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[4] The classical dividend discount formulation of share price value is:

$$Share\ Value = \frac{dividends}{discount\ rate\ minus\ growth\ rate}$$

For a discussion of some implications of this basic valuation equation and how each of its components may be shpaed by different regulatory programs, see Darby, "Regulation Is a Key Determinant of Investment and Efficiency" (cited above), especially the worksheet relating investment variables and regulatory variables at p. 10. Moreover, the key importance of the right hand side is compounded by the fact that traditional capital budgeting and real investment models for the firm also incorporate measures for expected earnings, or cash flow, and their behavior over time, as well as the discount rate. For a clear and readable discussion of the foundations of corporate decisions to invest and various models, see Richard Pike and Bill Neale, Corporate Finance and Investment: Decisions and Strategies, Prentice Hall, New York, 1993, (Part II, Investment Decisions and Strategies and especially chapter 5, "Investment Appraisal Methods" and Chapter 11, "The Capital Investment Process". For an explication of some implications of management's responsibility to shareholders, see Alfred Rappaport, Creating Shareholder Value: The New Standard for Business Performance, The Free Press, New York, 1986, especially chapter 1, Shareholder Value and Corporate Purpose, pp. 1-13.

[5] Rappaport, Creating Shareholder Value.

Changes in price caps will also modify the other two influences on share price -- growth and risk. Price cap changes will a) change investors' expectations about earnings growth and the ability of managers to grow earnings by increasing productivity and b) influence investors' estimates of both market risk and regulatory risk. These are especially important considerations in view of the intended effect of Commission adoption of price caps in the first place.

An important Commission purpose of replacing rate of return regulation with price caps was to give subject carriers incentives to become more efficient. The rationale is straightforward. Provide an opportunity for shareholders to capture the efficiency gains won by superior management performance and managers will be spurred to greater efficiency. Unlike under rate of return regulation, shareholders under price caps can be rewarded by the efforts of management to increase earnings by becoming more efficient.

Managers of ILECs have made substantial efficiency gains under price caps. Those gains have accrued to users of ILEC services and, as intended by the Commission, also to ILEC shareholders. However, while additional efficiency gains are no doubt possible and will be realized as new technologies and methods of production are introduced, it is critical to recognize that past productivity gains are not necessarily a useful guide to future gains. Indeed, rational managers will respond to price cap-type productivity incentives by implementing first the most highly leveraged and the surest (in terms of their impact on productivity) operational changes. Moreover, many operational changes that in the past have lead to productivity changes are not strictly replicable.[6] The combined tendencies for rational managers to adopt operational changes that are associated with the least risk and the highest expected leverage on firm productivity

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[6] For example, having saved on expenditures for extravagent use of paper clips and counted those new economies as part of its annual productivity increase, the firm cannot in subsequent time periods do more than continue, as it must, to accrue those savings. However, mere continuance of past efficiency gains will not contribute to meeting new and higher productivity gains in future years. Many productivity gains already recorded by price cap firms are the result of reductions in variable input costs, that once saved and counted as part of the productivity gain, simply cannot be saved again and counted as part of future gain. Many of the past gains have been of this sort -- economizing on variable input costs. Moreover, another important source of productivity is attributable to reductions in unit costs resulting from increased volume -- that is a reduction in short run unit costs as a resulat of improve capacity utilization. However, price cap carriers must rely for the most part on their customers to stimulate demand and output by passing through access charge reductions. Without a pass through, this source of productivity gain is largely denied price cap LECs. In the longer run of course productivity gains depend on investing in new technologies that permit shifting downward long run cost schedules. But, these productivity gains depend on investment, which depend, as argued in these comments, on the price cap rules in general and productivity offsets more specifically. There are four fundamental sources of productivity gains. These are combinations of short and long run changes influencing either the input side or the output side of firms' operations. The text summarizes a fuller analysis in Larry F. Darby, "Price Cap Productivity Factors Can Make or Break Telecom Infrastructure Investments", Communications Business and Finance vol. 2, No. 5 (March 17, 1995). I have also argued that "dynamic" efficiencies attributable to high levels of investment and innovation of the type influenced by price caps and productivity factors are assured to be more important to long run economic welfare than traditional "static" efficiencies in theinformation technology sector. See Larry F. Darby, "Innovation and Productivity Gains Lead to Increased Economic Welfare", Communications Business and Finance, vol. 3, No. 19 (September 30, 1996).

clearly imply that additional, future productivity gains will be harder and harder to achieve.[7]

Price Cap Regulation is Working; Changes Will Reduce ILEC Investment Incentives

Price caps are working as intended: ILECs are becoming more efficient; users have enjoyed lower rates; and, ILEC shareholders have enjoyed part of the benefits of managers' success in increasing efficiency. The value of savings from reductions in industry access fees has been placed at over $11 billion since 1990.[8] Access charge reductions for price cap carriers have been substantially greater since 1991 than for rate of return carriers. Investors have responded predictably and positively to these productivity gains.

But, the incentive effects of price caps and their positive influence on a) management's incentives to become more efficient, b) management's incentives to invest more and upgrade access-related facilities in response to those incentives and c) shareholders' response and encouragement of managers to use scarce cash to expand and upgrade such facilities all depend critically on the reliability and stability of the incentives once they are put into place. Investors base their valuations on expectations about future earnings growth and the anticipated variability of those earnings. These expectations are informed by experience with regulatory commitments.

Changing the price cap rules by increasing the productivity offset to recapture earnings motivated and won by increased efficiency will create uncertainty among investors about future earnings growth and increase the return they require as a condition of holding ILEC securities.

A prescriptive increase now in ILEC productivity offsets will discourage investment by reducing earnings, but even more importantly over the long run and in a dynamic sense, it will discourage investment by increasing regulatory risk attributable to the inability of shareholders to forecast regulatory constraints on earnings. In the limiting case, periodic readjustment of the forward-looking productivity offset in response to past management success, as measured by increases in efficiency and earnings, will be regarded by investors as tantamount to nearly full reinstitution of the inefficiency incentives and perverted payoff structure of rate of return regulation. Practically speaking, the effects on resource allocation, investment incentives and inducements to greater productivity will be negligible as before under rate of return regulation, which was long ago abandoned, for good reason, by the Commission.

Some argue that the productivity factor should be increased as a result of the increased efficiency of the ILECs, as measured either by superior operating efficiency improvements, or

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[7] Like the inhabitants of Lewis Carroll's Wonderland, firms under price caps must run faster and faster, just to stay in the same place. And, the faster they run, the more difficult it is to pick up the pace.

[8] "USTA Challenges Long Distance Industry to Reduce Long Distance Rates by $2.8 Billion", USTA News Release, June 17, 1998.

earnings or both.[9] But, readjusting the price cap index in response to earnings increases resulting from productivity gains will give investors mixed signals. They will not know whether carriers are subject to price caps or to rate of return regulation. If managers are penalized by subsequent adjustments in the X-Factor, both they and investors will adapt by disregarding the false incentives theoretically, but not in fact, embodied in the price cap scheme. The result will be a tendency toward lower efficiency, higher risk and less incentive for ILECs to invest in local exchange access facilities. The salutary efficiency and investment incentive effects of price caps will be largely or wholly destroyed. Whatever residual incentive effect left intact will depend on management and investor "guesses" about the real intentions of regulators. They must, in effect, bet on the answer to the question: "Will it be price caps or rate of return regulation?" Price caps will come to be regarded, by both managers and investors, as having reverted, as a practical matter to rate of return regulation.

Another reason advanced in the comments as the basis for raising the productivity offset, is the "need" to move rates to the level of a vague and still undefined notion of "economic cost". But, surely any reasonable notion of the economic cost of dramatic increases in the productivity offset and forced access charge reductions must reflect the loss of economic welfare associated with reduced investment and innovation. The efficiency or resource allocation is not improved by measures that on balance discourage capital formation in this important sector.

There are clear investment disincentive effects associated with changes in access charges, price caps and productivity factors being urged on the Commission. In contrast, I have found nothing in the record to suggest that rate reductions from changing the inputs of the price cap constraint will increase investment or innovation in either local networks or elsewhere.

In summary, notwithstanding conjectures about the negligible investment effects of prescriptive changes in LEC price caps based on the success of carriers' improvements in efficiency, such changes will have significant negative effects on management incentives to become more efficient and on each of the determinants -- risk, return and growth -- of financial and real investment in local exchange access facilities. And, there is no evidence offered of offsetting increases in incentives or promises of improved dynamic, economic performance elsewhere.

"Earnings" Data Reported by IXCs Do Not Support Prescriptive Adjustment of Access Charges

Several arguments for reducing access charges are based on assertions that the level of ILEC earnings are excessive. The data reported, however, do not support either the claims about earnings, nor the recommendations for prescription of higher productivity offsets.

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[9] For example,"...the X-Factor is substantially understated...[as is] dramatically confirmed by the pronounced increase in interstate rates of return experienced by the LECs in 1996 and 1997." (AT&T at p. ii). Similarly, based in part on evidence purporting to show that ILEC earnings are too high, MCI WorldCom concludes: "The Commission should also modify its price cap formula and change the productivity to 9.2%, which would more accurately reflect ILEC productivity going forward than the current 6.5%. (MCI WorldCom at p. i).

There are a wide variety of earnings-related measures. Not all of them are relevant in the present context; not all of them correspond to "real economic" values to which investors respond; and, none of those raised in comments represent earnings incentives to which ILEC managers, potential entrants or investors typically respond.

Earnings measures derived from regulatory accounting data, like those offered and referred in IXC comments, are particularly crude and unreliable indicators of "economic" earnings. Earnings based on FCC-prescribed cost data are accounting fictions. Investors and managers alike understand the noneconomic content of the rules and do not rely on them to make decisions where real economic values are at stake. Both investors and managers are aware that FCC-reported earnings are extremely sensitive to assumptions made about the rate of capital consumption and prescribed depreciation schedules. It is well known by managers, investors and regulators alike that regulators' choices of asset book lives and depreciation schedules in regulatory processes are highly discretionary. There is no disputing that the choice of depreciation schedules influences the level of current costs that are the basis for earnings measures.[10] It is also a simple exercise to show the influence of different rates of depreciation on the level of earnings.[11]

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[10] Divergence between book rates of return and accounting rates of return have been analyzed exhaustively in other contexts. The problem is not unique to telecommunications. Solomon has systematically analyzed the source of divergences between economic and accounting returns in several sectors. He found one of the most important sources to be the difference between "economic" rates of depreciation and the rates of depreciation actually reflected in the books. He emphasizes that lags between investment outlays and recoupment of those outlaws from cash flow must reflect real changes in the values of those assets; otherwise book earnings overstate actual economic returns. See, Ezra Solomon, "Return of Investment: The Relation of Book-yield to True Yield", in Research in Accounting Management (Chicago: American Accounting Association, 1966), reprinted in Alfred Rappaport, Information Decision Making, (Englewood Cliffs, N.J.: Prentice Hall, 1982).

Rappaport, Creating Shareholder Value, (p. 34) makes the point even more starkly:

> "It is important to emphasize that capitalization and depreciation policies are strictly accounting decisions that have no effect (except in some situations on taxes) on the company's cash flow and hence its economic rate of return.

[11] Back-of-the-envelope calculations indicate suggest very high elasticities of earnings changes with respect to changes in assumed depreciation rates. On reasonable assumptions, the arithmetic shows a one percent increase in the average rate of depreciation leading to a decrease of about 1.4% in total ILEC accounting earnings. The specific estimate will vary somewhat with assumptions made. But, the conclusion does not change. Earnings measured by the Commission are very sensitive to arbitrary accounting cost conventions prescribed by the Commission. The earnings measure can have no more integrity than the underlying cost measures.

Others have also found the likely discrepancy to be large and pervasive. Professor Franklin Fisher concluded: "Hence, only by accident will accounting rates of return be in one-to-one correspondence with economic rates of return...[and] the effects [of the measurement error] cannot be assumed to be small, [inasmuch as] they can be large enough to account for the entire interfirm variation of accounting rates of return among the largest firms in the United States." Franklin M. Fisher, "On the Misuse of Accounting Rates of Return to Infer Monopoly Profits", Industrial Organization, Economics and the Law, John Monz, ed., MIT Press, 1991, p. 80. (Emphasis added.)

AT&T Data. AT&T refers to the "sharp rise in the interstate rates of return of the price cap LECs in 1996 and 1997" as an indication that the LEC productivity offset is too low. Aside from the problems discussed above with prescribing new price cap rules because carriers earn too much -- given productivity performance under existing earning incentives -- the data relied on by AT&T to support its argument that interstate access earnings and charges are too high show no such thing.

To document its contentions AT&T relies on FCC estimates of interstate earnings and rates of return derived from Commission-prescribed accounting data.[12]

As discussed above these do not adequately represent the "correct" economic representation of costs. Moreover, the Commission has specifically abandoned book costs in establishing rates for interstate services, choosing instead to construct and rely on an entirely new cost theory and costing algorithm. Irrespective of the infirmities of forward-looking cost as a basis for evaluating and establishing interconnection charges, it is indeed ironic that respondents to the FCC's invitation to refresh the record rely on traditional FCC cost accounting methods to derive earnings and rate of return estimates, when in other proceedings they argue with great passion that the very same data are without merit as the basis for establishing other rates.[13]

Inspection of the return data reported suggests some interesting anomalies. Rate of return data for AT&T was not reported in 1995 and thereafter, but data for earlier years (1991-1994) is reported by AT&T. In 1994, the latest year for which the FCC has reported interstate returns for AT&T as a price cap company, the rate of return for AT&T was greater than that reported for NYNEX, SBC, US West, SNET, Frontier and about half (23 of 49) reporting GTE subsidiaries. And, the AT&T's interstate return (13.26%) was within 13 basis points of Ameritech's (13.39%) and 74 basis points from Bell Atlantic's.

Although the data do not permit comparisons of interstate returns based on FCC accounting data among AT&T and price cap companies for years after 1994, it is possible to compare across years. Doing so is revealing. The FCC-reported 1994 AT&T interstate rate of return (13.26%) exceeds FCC-reported 1997 interstate rates of return in several cases for price cap LECs in subsequent years. For example, the 13.26% AT&T return for 1994 (and its return in 1993, 1992 and 1991) exceeds the return calculated by the Commission for SBC, Pacific Bell and

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[12] Comments of AT&T Corp. to Update and Refresh the Record, Appendix D, "Interstate Rate of Return Summary -- Years 1991 through 1997 -- Price Cap Companies".

[13] In a discussion of the meaning of rates of return on equity and assets of IXCs and ILECs, Anna-Marie Kovacs, telecom securities analyst for Janney Montgomery Scott, highlights the differences between returns calculated on FCC regulated accounts and the financial books reported to the Securities Exchange Commission and used by most analysts "...in an environment in which regulators are focusing on forward-looking costs, one proxy they are likely to use is financials as reported to shareholders, since the financial books reflect the companies assets and depreciation at levels close to their market value, i.e. at more or less "forward-looking" values." Anna-Marie Kovacs, "Telecom Industry Note: Joint Board Meets to Discuss the Universal Service Fund", Janney Montgomery Scott, Fax transmission received June 9, 1998, p. 4.

several GTE companies for 1997.

Although, the earnings data offered by AT&T to support its "excessive earnings for ILECs" allegation are flawed by reliance on arbitrary and decidedly uneconomic depreciation accounting conventions, they do nevertheless indicate, if the Commission decides to rely on them, that AT&T's historic earnings from the "competitive" interexchange business, when calculated by the FCC, exceeded contemporaneous earnings of ILECs and, indeed, exceeded the earnings of some ILECs three years later.

MCI WorldCom Data. The data relied on by MCI raise problems of another sort. MCI avers that "the RBOCs continue to report record monopoly profits".[14] Appendix A entitled "RBOC Financials" is intended to support this contention. Notwithstanding the title, the data are much less robust and do not in any event contain sufficient information to warrant any conclusion about the either level of profits or the extent to which they approach monopoly levels.

The Appendix A tables offered as proof are included in eleven sheets, none of which even purports to show meaningful indicators of profitability which, at a minimum, incorporate reliable estimates of both "economic" earnings and correct valuations of capital deployed to generate those earnings. Both are required to estimate economic rates of return -- "economic" earnings relative to "economic" capital deployed. But, even then, such measures do not reach the question of whether the earnings are reasonable in view of the associated risks. None of this is reflected or considered in the MCI WorldCom proof.

Nine of the eleven sheets refer in part or wholly to various margins -- ratios of EBITDA, operating income or net income to revenue. Such ratios, while commonly used in financial analysis, have limited meaning standing alone and certainly cannot support any conclusion about rates of return or monopoly profits without complementary data on assets deployed, asset turnover rates, capital structure, depreciation schedules, risk, capital costs and other indicia commonly used to determine "economic" returns.

One of the tables offered as evidence in support of the "excessive profit" thesis shows that access revenue has increased in the last three and a half years. Surely revenue growth is not a reliable measure of profit. Nor is there any probative value as to the reasonableness of earnings in the fact that these margins have been stable in the last three and a half years. Finally, inasmuch as net income and earnings in growing firms in intensively competitive industries will frequently increase over time, the fact that they are growing year to year for LECs provides no support for MCI WorldCom's thesis.

While financial ratios have limited value standing alone, they may take on added meaning when viewed in the context of other ratios and financial information. Indeed, many financial

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[14] MCI WorldCom, Inc., Comments in CC Docket No. 96-262, filed October 26, 1998, p. 10.

analyses incorporate and relate several ratios to comprise a system of indicators to characterize financial information of interest to management and investors.[15]

One of the tables in the MCI Appendix is entitled "RBOCs Continue to Report Monopoly Profits". The first bar chart depicts "EBITDA Margin -- 1997" for five RBOCs, an RBOC average and an IXC average. But, EBITDA does not measure profits, nor does an EBITDA margin reflect profit in either an economic, accounting or financial sense. While analysts make use of EBITDA as a measure of cash flow, no financial analyst uses it as a measure of profit. Indeed, EBITDA typically includes large amounts of expenses that must be paid before profits available to shareholders can be estimated.

Taken literally, EBITDA abbreviates earnings before deduction of interest, taxes, depreciation and amortization. The "profits" being measured here include what the firms must pay its creditors (I), what it must pay the government (T), what it must charge itself for loss of value of capital assets (D) or other similar capital charges (A). As such EBITDA is not a very useful measure of accounting profit and it gives no hint at all about "economic" profititability.

Three of the Appendix A sheets are offered to support a conclusion that interstate access charges and interstate LEC earnings are too high by comparing net margins of Regional Bell holding companies to assorted other firms and industries.[16] But the financial condition, including margins, of the Regional Bell holding companies is the combined result of interstate and intrastate operations of the telephone companies and the performance of other diversified, nonregulated business lines in which the holding companies participate. As such, margin data describing holding company operations have no material bearing on the reasonableness of current interstate telephone earnings or whether access charges should be changed.[17]

In short, the financial data in Appendix A offered by MCI WorldCom provides no support for either the "profits" thesis or the recommendation that interstate access charges be

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[15] One the best known is the so-called "Du Pont" system, a method of analysis that stitches together different ratios - for example, returns to equity, profit margins, capital turnover rates and capital structure -- to show how each individually, and all taken together, influences overall financial performance. Further disaggregation and other ratios can be incorporated, depending on the questions of interest to the analyst, but the main point is that a single ratio has very limited value in assessing the financial performance of a firm. For a very readable elaboration of these points, see Erich A. Helfert, Techniques of Financial Analysis, Chapter 3, "Assessment of Business Performance", Irwin McGraw-Hill, ninth edition, 1997.

[16] See specifically MCI Appendix A sheet entitled "RBOCs and GTE have Higher Profit Margins than Most IXCs and Most Monopolies" and two sheets entitled "The RBOCs and GTE Are Among the Most Profitable Companies in the World."

[17] An interesting artifact of the assertion of these sheets alleging monopoly profits is the fact that, if taken literally, they show that AT&T with a net margin in 1997 of 8.7% is more than twice as profitable as MCI with a net margin of 4.0%. Or, that Soaps and Cosmetics (8.5%), one of the most intensely competitive sectors in the nation, is the eighth most profitable business sector in the world and 6X more profitable than, say, Hotels, Casinos and Resorts (1.4%).

reduced.

Transferring Earnings from LECs to IXCs Will Discourage Competitive Local Investment

Lowering interstate access charges could very well reduce the incentive for both competitive entry and added investment by other firms. This disincentive effect may extend to other potential entrants and investors in alternative local access and distribution facilities -- including investment by CLECS, cable companies, IXCs, utility companies or others using wireless technologies.

The allocative and dynamic efficiency effects likely to result from a prescriptive reduction in LEC access charges will depend on several features of it, not all of which can be accurately anticipated at this time, and almost none of which are addressed by advocates of substantial, immediate and retroactive reductions. As discussed above, the transfer of earnings from ILECs will undermine both the ability and incentives of ILECs to invest in local infrastructure. While serious, that conclusion need not be conclusive and dispositive, if there are offsetting advantages in other areas. However, it appears that investment disincentives for ILECs of a reduction in interstate access charges is not offset by increased investment incentives by actual or potential competitors. Indeed, it is reasonable to anticipate that interstate access charge reductions will reduce these investment incentives as well.

Effects on CLECs. The CLECs are a diverse lot.[18] They have quite different business plans relying on different technologies that target different user groups and usage segments. They range from power companies to cable television providers and others using wireline technologies to companies using assorted wireless technologies and applications. Business plans of some CLECs reflect opportunities and intentions to address and penetrate markets for access services.

The incentives for CLECs to invest in local facilities are not homogenous across this diverse set of firms. Nevertheless, with respect to the incentives for those planning to provide competition for ILECs in the provision of interstate access services -- the rates for which are at issue here -- the effect of reducing existing rates will be to discourage their investment. And, the greater the reduction, the greater the disincentive. Earnings margins are the magnet that draws competitive entry. While the impact on incentives for entrants obviously should not the sole consideration, the Commission cannot, given the primacy of its goal of promoting local competition, completely ignore the likely effect of access charge reductions on that goal or the comparably important one of encouraging investment.

Effects on IXCs. The most substantial, direct, immediate and certain impact in the

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[18] For a detailed report of the set of competitive local exchange carriers and profiles – size, growth, focus, strategies, markets addressed, history, etc -- of individual competitive firms, see New Paradigm Resources Group, Inc., 1998 Annual Report of Local Telecommunications Competition.

market of prescriptive reductions in LEC access charges will be to reduce IXC operating costs and increase cash flow and earnings. These increased earnings will be reflected in increases in stock prices of publicly traded IXCs.[19] Without other intervening or induced changes in IXC market conduct, the result will be to flow through more of the top line (interstate revenues) to the bottom line (after tax earnings) for interstate, interexchange carriers. And, without other intervening changes accompanying or induced by the reduction in IXC access cost, the effect will be merely to shift wealth from LEC shareholders to IXC shareholders.

But, just as any prescriptive access charge reduction will have an effect on LEC conduct, it is likely that the reduction in access charges will induce IXCs to modify their market conduct. When and in what ways is subject to both uncertainty and contention. Some of the possibilities are discussed briefly below.

IXCs may pass along all or part of the cost reductions to users by reducing rates. The economic welfare effect of the share that is retained can be considered along the lines discussed above. The portion that is "passed along" to users is more complicated to measure, verify retrospectively, and to evaluate the accompanying welfare implications. Given the oligopolistic structure of the IXC industry and the dappled history of past access-related cost reductions, it is not clear *a priori* whether and to what extent there is an incentive to pass along access charge reductions, nor or to verify empirically the extent to which such reductions have been absorbed by IXC shareholders or passed through to end users. Despite the conclusion of several parties that access charges are not being reflected in lower long distance rates and requests for data and proof, the Commission has not apparently received sufficient information from the IXCs to permit it to calculate a weighted index of interstate rate changes that would support IXC claims to the contrary.[20]

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[19] The relationship between LEC access cost reduction-driven increases in IXC stock price can be approximated by multiplying the change in access cost by one minus the corporate tax rate (which gives the change in after tax earnings); then multiplying the result by the firm's price earnings ratio (which gives the increase in the value of all outstanding shares); then dividing by the number of shares. These simple calculations yield a rough approximation of the potential increase in a given IXC's share price attributable to a given potential access charge reduction.

[20] See, Comments of the Office of Advocacy – United States Small Business Administration in CC Docket No. 96-262, filed October 26, 1998, pp. 3-4 for discussion of the problem of determining changes in the level of interstate, long distance telephone rates when their structure is changing -- some rates going up, while others are declining. Advocacy pointed out: "Although Advocacy requested in March 1998, that the Commission include a breakdown of rate savings and surcharges by consumer class (i.e., residential, small business and large business customers) in its investigation of MCI's, Sprint's and AT&T's alleged pass-through of access charge savings via lower rates, it is our understanding the FCC has not received sufficient information on this subject." (p. 3) Advocacy documents that rates for small business have increased in many cases, even as more highly publicized rate reductions are offered other users. IXCs offer anecdotal evidence of pass-throughs while maintaining that average rates per minute have been declining. But, as I have shown elsewhere, unweighted average rates per minute are not reliable indexes of overall rate levels and changes. Indeed, it can be shown that with quantity weights changing as they have been recently, it is possible for average (unweighted) rates per minute to fall, while in fact all individual rates have gone up. See, Larry F. Darby, "Long Distance Telephone Rates: Going Down, or Going Up?", Communications, Business and Finance, vol. 2, no. 5. March 2, 1995. See also the NERA Study referred to by the SBA Office of Advocacy (Appendix A): Paul S. Brandon, "Flowthrough of January 1, 1998 Access Charge Changes to Small Business Customers", National Economic Research

IXCs could use the added cash to build additional local exchange facilities to compete directly with those whose services they obtain from the local exchange companies. They could build competitive facilities, but the effects, *a priori*, of the access charge reductions are counterindicative. The reductions create more cash for the IXCs and provide internally generated funds that could be used a countless variety of ways -- one of which might be investment in competitive facilities. The increase in cash flow could increase the ability of IXCs to invest. But, the reduction in ILEC access charges weakens the business case and reduces the incentive to build alternative facilities in competition with those of the LECs. The net effect of an increase in the ability of IXCs to invest and a companion reduction in their incentives is indeterminate.

IXCs Are Financially Healthy

If large interstate access customers of the ILECs were in financial distress, rendered incapable of offering good service or otherwise seriously hampered by the level of access charges, there could be cause there for Commission inquiry into those relationships. Even then, so far as I know, there is no basis in either law or economics for Commission actions to attempt to equalize or level earnings across regulated companies in different services markets. More specifically, there is certainly no such basis in the record of this proceeding. But, the burden of access charges and the lawful level of earnings of price cap carriers has been made an issue and, accordingly, have brought into play considerations of the financial health and ability to render good service of large users of interstate access – MCI WorldCom and AT&T in particular.

MCI WorldCom. The lead sentence of a recent Salomon Smith Barney analysis states:

> "WorldCom, which has finally closed the MCI deal, is in a class by itself in the telecom industry. Pro forma for MCI, WorldCom is a $30 billion-plus company with near 20% revenue growth, over 30% five year EPS growth, significant free cash flow, low debt, and the best and most diverse set of assets in the global telecom universe. In fact, one can't find another company in the entire S&P 500 that matches these metrics (e.g., Microsoft isn't as big in revenues and Walmart doesn't grow as fast in EPS [earnings per share]). Thus, we expect P/E (the ratio of share price to earnings) expansion on accelerating earnings, which will lead to huge stock appreciation.[21]

Associates, September 17, 1998. This study indicates that IXCs have raised rates to small business customers even as access charges have fallen.

[21] Jack Grubman, Salomon Smith Barney, "With MCI Deal Closed, WorldCom's in a Class by Itself--Best Telecom Assets in the World-- A Great Story Getting Better", (October 9, 1998), p. 3. Grubman's conclusion and analysis here is pointedly relevant to questions addressed earlier about likely uses of free cash by MCI WorldCom made available from hypothetical prescriptive LEC access reductions. Mr. Grubman goes on to analyze the capital plans of the

The analyst continues and compares the new joined companies in comparison to large LECs:

> WorldCom can do local for an MCI business customer as well as a Bell can but no Bell can remotely match WorldCom's ability to serve an MCI business customer for global or national network services.[22]

Similarly, Warburg Dillon Read believes that MCI WorldCom is at the forefront of the telecommunications industry in terms of combining unique assets to provide a fully integrated telecommunications offering including local, long distance, and data Internet services in both domestic and international markets. The WDR telecom equities analysts write:

> ...[We] believe the merger will create significant synergies...with the combined entity leveraging each others assets to achieve strong cost savings and operating efficiencies...We estimate these significant potential synergies coupled with strong positioning in the high growth areas of the telecom industry...should drive strong EPS [earnings per share] growth through 2003.[23]

Analysts' views of AT&T. The financial situation of AT&T is a little harder to characterize, given the very substantial flux in its operations and direction in recent months. Nevertheless, there is no indication that the current level of access charges is creating financial hardship or otherwise interefering with the company's ability to offer high quality, competitive interstate long distance services. To that point, Janney Montgomery Scott recently summarized its view of AT&T as follows:

> By our estimates, AT&T's return on its long distance assets (ROA) in 1997 was about 30% and its return on long distance equity (ROE) was about 80%...the ROE

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combined company and observes in the process that because of capital synergies availed by the combination of the two companies, they will be able to meet their combined, standalone capital spending program of $7.5 billion for about $2 billion less.

> What is important about this [combination] is the fact that the combined companies--if they just kept at their individual capital spending programs--would have spent about $7.5 billion. But, because of the capital synergies, they can build everything they were going to build for $5.5 billion. In fact MCI's capital 1998 budget will be only $3 billion versus their original estimate of $3.9 billion, since MCI is already saving on local builds knowing that WorldCom has facilities. (P. 5)

All of this is without regard to the possibility of additional free cash being generated by prescriptive access charge reductions. Notably, Mr. Grubman concludes: Even with capital spending that does not incorporate all of the capital synergies, the fact of the matter is that WCOM pro forma for MCI will be free cash flow positive in 1Q99..." (p. 5). Again, all this is without regard to any infusion of free cash from access charge reductions.

[22] Ibid., p. 3.

[23] Linda B. Meltzer and Jeff Mosca, "Telecommunications Services: The Ever-Changing Landscape", Warburg Dillon Read, Fall 1998, p. 6.

> on business long distance was about 60% and on residential long distance was about 110%. AT&T's long distance EBIT (earnings before interest and taxes) margin of 23% is by far the best among major long distance players.[24]
>
> Similarly, Janney Montgomery Scott summarized Sprint's financial circumstances:
>
> Sprint's EBIT margin in 1997 in long distance was roughly 12%. We estimate that its (Sprint's) long distance ROA was roughly 10 % and its long distance ROE was about 20%. Sprint's asset turnover was about 1.4 times [compared to asset turnover for AT&T of 2 times]." Ms. Kovacs observed: "This is a business in which scale clearly counts."[25]

There seems little to gain by reporting similar observations made recently by other analysts. It is notable, however, that here is no indication from my review of selected of Wall Street securities analysts' publications on the IXC sector that the level of interstate access charges is undermining their ability to earn adequate returns, maintain high quality interstate service or to assure continued good access to capital markets.

Assessments of Respondents Not Consistent with Capital Market Views

Several commentors addressed the degree, level or intensity of competition in the local exchange market. Much of the evidence is based on old data, or recent data that is backward looking, or data describing the tendency of new entrants to forego offering service to residential users. The latter point is generally made outside the context of the entry-discouraging effects of artificially low residential rates maintained in pursuit of universal service goals.

Since the issue is the desired level of future access charges, the Commission should heed past market share data only to the extent that it is a reliable indicator of what is likely to prevail in the future. A forward looking perspective is critical to any evaluation of the effects of changes in access charges on carriers' incentives and ability to invest and innovate. Investment and innovation decisions are by their very nature "forward looking" and grounded firmly in expectations about future conditions. Given the dynamism of the telecommunications sector, investors cannot and do not rely on the rear view mirror as an indicator of what lies ahead. The Commission itself has pointed out on countless occasions that this is one of the most technologically and economically dynamic sectors of the economy and marked by frequent and often unpredictable change.

The local exchange market is being transformed very rapidly by a combination of

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[24] Anna-Marie Kovacs, "Telecom Industry Note: Joint Board Meets to Discuss the Universal Service Fund", Janney Montgomery Scott, Fax transmission dated June 9, 1998, p. 4.

[25] Ibid., p. 4.

economic, technological and regulatory forces. Investments in competitive facilities and alternatives are being made at very substantial rates. It is grossly misleading to characterize current and future market conditions as some commentors have.[26]

From an investment incentive point of view simple percentage point measures of loss of share of market revenues is not a very useful indicator of either the seriousness of the past losses or their implications for expected payoffs of future investments. Given that the markets being targeted are the high margin markets, revenues losses seriously understate the financial impact of past and future competition. Competition is ultimately about earnings, not revenue. The implication, in short, is that measures of historical revenue share loss have limited value as indicators of expected future earnings, risk, growth and other determinants of investment.

Investors in the companies securities, managers who determine the allocation of scarce capital budgets and managers who must plan for, and achieve, future productivity targets are all forward looking in their consideration of the impact of access charges and changes to the rules establishing them. It is imperative that the Commission adopt a parallel perspective.

Past losses of line share or revenue share are not a very useful indicator of the impact of competition on investment in this dynamic, rapidly changing marketplace. At best it is a weak indicator that must be viewed in context of other, more powerful, forward looking competitive gauges. A more reliable marker than loss of revenue share for characterizing the state of competition on a forward looking basis can be gleaned from the reports of securities' analysts, whose performance is measured by their ability to foretell future developments in the local exchange market.

According to my recent review of reports of Wall Street telecommunications securities' analysts, most of them emphasize to investors that market forces are becoming increasingly pervasive and more reliable as a means of disciplining LEC ratemaking processes. They note significant increases in competitive market risks for incumbent LECs. Some of these views are summarized below.

Analysts for Paine Webber tell investors to anticipate that ILEC revenue growth will slow through 1998 and 1999 as competitors "increase their provisioning resources, improve sales skills and market awareness of alternatives increases." Moreover, Paine Webber "expects that the RBOCs will have negative net line growth by the year 2000" and that "high operating

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[26] For example, one respondent cites a 1997 CFA study and its own subsequent report and concludes that "meaningful levels of exchange access and exchange telephone service competition have not developed, and will not develop in the foreseeable future." and that, "Today...eighteen months after the Commission adopted its Access Charge Reform Order and Price Cap Review Order, the competitive landscape for interstate access charges has remained virtually unchanged." (MCI Comments., p. 8) Both of these statements are simply wrong. The level of competition in local markets is meaningful to the business plans to investors; to incumbents; to customers; to competitive carriers and to regulators.

leverage means that earnings growth could slow by more than revenue growth.[27] In a nutshell, this means that competitors are becoming more adept; which will lead to loss of line and revenue share; and that the impact on ILEC bottom lines will be greater than suggested by mere share losses alone.

The telecom analyst for Merrill Lynch estimates that year over year growth of CLECs is about 60 % and 36 % over the most recent quarter. He also notes that by the end of the second quarter, CLECs grew by about a half billion in sales, representing share growth from the first to the second quarter of 1998 from 3.5% to 4.1 percent.[28] CLECs are expected by securities analysts to continue to grow. "We do not see the current environment slowing the plans for new entrants."[29] Some indicate that CLEC growth will accelerate. The Warburg Dillon Read analyst. Ms. Linda Meltzer, notes:

> The CLECs are beginning to gain a significant portion of RHC/GTE business lines (roughly 5% as of the 1998 second quarter, up from 4% in the first quarter of 1998).and to accelerate. We believe this trend will likely accelerate in the second half of 1998 with greater diversification. Competition for large telcos will further intensify...[30]

Ms. Meltzer's observation not only gives the lie to comments about a virtually unchanging competitive landscape, it also calls attention to the fact that as competition intensifies, growth in minutes – an important source of ILEC productivity growth – will become increasingly difficult

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[27] Eric Strumingher and Batya Levi, "Pressures Mounting on RBOC EPS Growth", Telecommunications Services -- Paine Webber, May 14, 1998, p. 8. Elsewhere Strumingher and Levi note: "Our investment opinion on the RBOCs is grounded in the view that the Bells are getting the short end of the stick in the deregulation of the telecommunications industry and will be unable to sustain earnings growth and return on investment at the record levels they have enjoyed over the past two years. Eric Strumingher, Regional Bell Operating Companies (RBOCS): A Telecom Industry Oxymoron, Paine Webber (p. 1, emphasis added). Also, "We believe that the largest beneficiary of industry deregulation is MCI WorldCom (WCOM), our top pick in the telecommunications services sector. (Eric Strumingher, "Regulatory Issues on the Front Burner", Paine Webber, p. 2.

[28] Dan Reingold, "CLEC Update: Continued Weakness in the Sector Creates a Great Buying Opportunity", Merrill Lynch, 22 September 1998, p.1. Another analyst concludes that that CLECs are offensive and defensive stocks. His analysis suggests that the CLECs should not be selling at such large discounts to RBOC stocks, in part since "the CLECs will over time gain share, while the Bells over time will lose share." Jack Grubman, "CLEC Stocks Way Oversold -- Competitive Local Exchange Carriers Are Actually Sleeper Recession Stocks", Salomon Smith Barney; Telecom Services Industry Report, October 20, 1998, (p.6).

[29] Michael J. Renegar and Kenneth M. Leon, Industry Report, "CLECs; Its Nearly Unanimous: Bigger is Better, ABN-AMRO, (December 30, 1997), p. 7.

[30] Linda B. Meltzer and Jeff Mosca, "Telecommunications Services: The Ever-Changing Landscape", Warburg Dillon Read, Fall 1998, p. 5.

to achieve and will certainly be more difficult than in the past.[31]

Reflecting on the value of backward-looking performance measures as an indicator of what lies ahead for ILECs, other analysts sound very cautionary notes:

> However, looks can be deceiving. The outstanding operating results and stock performance in 1997 cannot mask the Bells' vulnerability to competitive and regulatory risks forever. Based on our most recent review of the competitive and regulatory landscape, we are more confident than ever that the current rate of earnings growth and investment return is unsustainable. We fail to see how the RBOCs can maintain mid-single digit revenue growth and double-digit EPS growth over the next few years..."[32] (Emphasis added.)

In the context of one of the impact of increases in the productivity offset for ILECs, Strumingher and Levi pointedly observed:

> "Not only do we expect competition to accelerate, but we do not expect to see improved operation efficiency as a major driver of earnings growth as it has been in the past three years.[33]

And, further contesting assertions that regulation does not matter to investors:

> We believe that investment decisions based on perceptions that local exchange competition will be a nonevent...are misguided."[34]

In discussing the combined effects of the FCC's policies in implementing the Telecommunications Act of 1996, and reflecting views relevant to the present Notice, Scott Cleland, head of the Precursor Research Group of the Legg Mason Research Technology Team concludes:

> The Precursor Group believes implementation of the Telecom Act has had more a skewing and dampening effect on facilities investment than most investors appreciate. Wireline telecom companies have vastly different regulatory incentives and disincentives on the margin to invest in new or upgraded

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[31] As in Alice's Wonderland, not only must firms run faster and faster to stay in the same place, they must do so subject to conditions making it more difficult to run at any pace. (See note 7 above.)

[32] Eric Strumingher and Batya Levi, "Pressures Mounting on RBOC EPS Growth", Telecommunications Services, Paine Webber, May 14, 1998 (p.5).

[33] Strumingher and Levi, p. 5.

[34] Strumingher and Levi, p. 5.

> facilities...ironically, eight of the largest 10 telecom companies with the greatest ability to spend on facilities (Bell Atlantic, Bell South, Ameritech, SBC, USWest, AT&T, MCI and Bell South) for various reasons have the most regulatory disincentives *on the margin* to spend on new facilities... (Emphasis added.)

Addressing the actual impact of the FCC's policies on investment, Cleland points out:

> ...FCC policies are thus counting on the relatively lesser capitalized companies to fund construction of the new capital-intensive facilities... While the Bells continue their traditional infrastructure spending, *on the margin* the Bells have the least incentive to upgrade their network...[and]the Bells have precious little incentive to upgrade their network any more than is necessary for existing *services*.[35]

In direct contradiction of respondent claims that access charges do not matter to investment, Mr. Cleland pointedly observes:

> ... [I]nterstate access charges paid annually to the local telcos is the fulcrum point on which so many critical investment issues and business models pivot: (a) competitive bypass and arbitrage for CLECs; (b) the rate of emerging competition; c) the profitability of both the telcos and the long distance providers; [and others] d) the government's hyperstimulation of data growth; and, (e) the movement towards a system of explicit universal service subsidies." TPG cautions investors to remain vigilant concerning access charges policy changes because so many telecom investment theses ride on [assumptions about these access charge changes].[36]

Analysts specializing in coverage of the CLECs come to similar or supporting conclusions to those reported above. Mr. John Hodulik, Paine Webber's CLEC analyst reports:

> With less than a 5% aggregate share and forecasts for up to 40% penetration of business lines in some markets, the CLECs remain at the early stages of their growth cycle. Competing with recent monopolists in an industry requiring increased levels of customer service and product customization is a business case we believe to be very attractive...circumstances have opened the $175 billion domestic telecommunications services markets and set the stage for a 40-50%

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[35] Scott C. Cleland, "Where's the Bandwidth -- Regulations Skewing Facilities Investment?" Legg Mason Technology Team, Precursor Research, September 24, 1998, p. 1 (emphasis in the original).

[36] Scott C. Cleland, "Subsidy Wars: Note the Enormous Stresses on the Access Charge System", Legg Mason Technology Team, Precursor Research, (Jun 17, 1998), p.1.

> shift in local service market share."[37]

The number of competitors continues to grow. They are raising and deploying growing amounts of capital. They are in a strong cash position. According to the Salomon analyst:

> All 11 CLECs we publish on should have positive cash on hand at the end of 1999...the CLECs we follow do not have to change their business plans one iota and will be fully funded through the end of 1999.[38]

Investors expect rapid growth. According to Paine Webber, "In this stage of the industry life cycle, we expect high double- and triple digit growth rates to continue."[39] And investors understand that entry will lead to pressure on margins: "Increased competition will inevitably lead to pricing pressure."[40]

The foregoing views of analysts paint a picture very different from the one emergent in comments of supporters of substantial, retroactive, prescriptive reductions of access charges. Competition is indeed growing in markets for local access. Moreover, the Commission has indicated that penetration of competitors is proceeding faster than competitive growth in the long distance business twenty years ago. Business Week recently reported: "...these days the FCC is waving around a Merrill Lynch study that disputes the pundits who declare the 1996 Telecommunications Act a failure." In response to claims that the main effect of the Act has been to spur industry consolidation, Business Week reports, "Not true, counters the FCC: competition is moving faster than the 1980s battle over long distance. Two years after the Act, rivals have captured 3.5% of local phone revenues from the Baby Bells, says Merrill. In contrast, two years after the 1979 court decision letting MCI sell long distance service, [competitive] carriers had won only 1.4% of the market from AT&T, the FCC notes."[41]

Merrill Lynch predicts that next year -- during the fourth year after the 1996 Act -- the CLECs will grow to capture a 6% share. Merrill points out that the target being addressed by CLECs -- business users -- is 60% of local market revenue; that CLECs will address over half of that market and win a thirty percent share of this addressable market by 2008, a dozen years after the 1996 Act. In contrast, it took about a decade for MCI and others to capture a 25% share of

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[37] John Hodulik, "The Data Carriers: Initiating Coverage of the CLEC Industry" Paine Webber -- Telecommunications Services: July 27, 1998, p. 1.

[38] Grubman, "CLEC Stocks Way Oversold", p. 9.

[39] Paine Webber, p. 21.

[40] Paine Webber, p. 21.

[41] Business Week, September 28, 1998, p. 6. For a more extensive discussion of the pace of development of local competition, see Larry F. Darby, "Local Competition: Alive, Well and Growing", Communications Business and Finance, vol. 5, no. 19, pp. 8-12.

the addressable (business and residential) long distance market. It is important to note a critical difference in the comparison. Competition in the long distance business was not hampered by rates for residential service that were rendered artificially low by government enforced inter-service rate subsidies and which result in making local residential customers largely unaddressed or unaddressable by competitors.

Summary and Conclusions

Regulation of telecommunications carrier rate levels and rate structures by the FCC has important effects on the incentive and ability of regulated firms to invest and innovate. The level of interstate access charges is particularly important in this respect, for such charges should influence what consumers pay in the retail market; what interconnecting IXCs pay; and, the earnings, growth and risk of both ILECs and CLECs. These basic conclusions are contrary to impressions intended and left in comments.

The effects of prescriptive reductions in ILEC interstate access charges will be realized in several dimensions. Merely transferring wealth from one class of shareholder (ILECs) to another class (IXCs) will not contribute to greater investment and may lead to less. Nor will the transfer necessarily help end users directly. And, to the extent that the transfer is made possible by prescriptive reductions in access charges, the incentive to invest for both ILECs and CLECs will be diminished – the former because of lowered present value of such investments and the latter because lowered access charges reduce expected returns for new CLED investment.

Arguments based on FCC accounting data suggesting ILEC earnings are excessive cannot be sustained. Regulatory accounting earnings are not considered by rational investors, who demand value based on economic returns, not accounting fictions. Further, episodic and unpredictable changes in price caps and the underlying productivity offsets will undermine the entire basis for price caps and may very well convince investors that the change from rate of return regulation to price cap regulation was more apparent than real. This will clearly signal the end of both the intended and actual salutary effects of price caps.

Notwithstanding representations in comments, local competition is alive and well. Competitors are capable, healthy, diversifying, growing and increasingly well-financed. FCC Chairman William Kennard got it right. "It takes patience and persistence to move a market from monopoly to competition."[42] The market is working. Regulatory reform of earnings regulation is working. The Commission should not abandon either and revert to failed regulatory approaches.

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[42] Cited in Business Week, p. 6.

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"Regulation Matters to Investment and Efficiency in Telecommunications" in Capital Formation: The Forces That Influence Investment, Telecommunications Reports International Journal, Vol.1, Issue No. 2, September/October 1997, pp. 1-10.

Competition in Wireless Telecom Services in the Gulf of Mexico, Appended to submission of Petroleum Communications, Inc. In WT Docket No. 97-112 (In the Matter of Cellular Service and Other Commercial Services in the Gulf of Mexico); July 2, 1997

"Impacts of the 1996 Telecom Act on Investment and Innovation", New Telecom Quarterly, vol. 5, Issue no. 2, Second Quarter, 1997, pp. 21-30.

Consumer Welfare Effects of Proposed Regulatory Treatment of LEC Broadband Costs, submitted with the comments of BellSouth Corporation and BellSouth Telecommunications, Inc. in CC Docket No. 96-112 (In the Matter of Allocation of Costs Associated with Local Exchange Carrier Provision of Video Programming Services), July 26, 1996.

Declaration of Dr. Larry F. Darby: In the Matter of Allocation of Costs Associated with Local Exchange Carrier Provision of Video Programming Services, submitted with the comments of BellSouth Corporation and BellSouth Telecommunications, Inc. in Docket 96-112, June 10, 1996.

Defining the Relevant Market for 37-39 GHz Services, submitted to the Federal Communications Commission as appendix to Comments of the Advanced Radio Telecom Corp. In ET Docket No. 95- 183: RM 8553 and in PP Docket No. 93-253, : In the matter of Amendment of the Commission's Rules Regarding the 37.0-38.6 GHz and 38.6-40.0 GHz Bands and Implementation of Section 309(j) of the Act -- Competitive Bidding 37.0-38.6 and 38.6-40.0 Ghz, respectively) March 4, 1996.

Digital Audio Radio: Critique of Economic Harm Studies, appended to Reply comments of Digital Satellite Broadcasting Corporation in FCC Notice of Proposed Rulemaking (Establishment of Rules and Policies for the Digital Audio Satellite Service in the 2310-2360 Frequency Band), General Docket No. 90-357, October 13, 1995

Economic and Financial Aspects of U.S. Commercial and Radio Broadcasting, appended to comments of Digital Satellite Broadcasting Corporation in FCC Notice of Proposed Rulemaking (Establishment of Rules and Policies for the Digital Audio Satellite Service in the 2310-2360 Frequency Band, General Docket No. 90-357, September, 15, 1995.

Policy Implications of Spectrum Valuation and License Auctions, Testimony before the Committee on Commerce, Science and Transportation of the United States Senate; July 27, 1995.

Analysis of AT&T Market Power in the Resale Marketplace, submitted with the comments of the Telecommunications Reseller Association to the Federal Communications Commission in the matter of AT&T Petition to Be Declared a Non-Dominant Carrier, June 9, 1995.

Economic Impacts in Docket 93-61 -- Preliminary Estimates of Markets for Alternative Uses of the 902-928 Mhz Band, Appended to submission of Metricom Inc. in PR Docket 93-61 (In the Matter of Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems); January 13, 1995.

"Telecommunications Capital Formation, Regulation and Economic Development: A Primer", New Telecom Quarterly, vol. 5, No. 3, August 1994, pp. 45-52.

Price Cap Reform, Financial Incentives and Exchange Carrier Investment, Appended to comments of the United States Telephone Associated in Federal Communications Local Exchange Carrier Price Cap Review Proceeding, CC Docket 94-1, May 9, 1994

Implementation of Broadcast High Definition Television: Costs, Risks and Burdens, Monograph prepared for Maximum Service Telecasters, Inc. (MSTV), July 17, 1992, 47 pp. (Circulated on Confidential Basis)

Broadcast HDTV Implementation: Strategic Considerations, Monograph prepared for Association of Maximum Service Telecasters (AMST), October 16, 1991, 42 pp. (Circulated on Confidential Basis)

Capital Formation in U.S. Telecommunications, submitted to the National Telecommunications and Information Agency of the Department of Commerce in response to NTIA Notice of Inquiry (55 Fed. Reg. 800--1990) In re: Comprehensive Study of the Domestic Telecommunications Infrastructure: May 24, 1990

"Regulatory Practices and Access to Capital Markets", in James H. Alleman and Richard D. Emmerson, eds., Perspectives on the Telephone Industry: The Challenge for the Future (New York: Harper & Row, 1989), pp. 25-40.

Economic Potential of Advanced Television Products, Monograph prepared for for the National Telecommunications and Information Administration of the US Department of Commerce, April 7, 1988; 54 pp.

"Investment Notes", Communications, Business and Finance, Telecommunications Reports International, Inc., approximately 100 columns of commentary on telecommunications issues (1500-2000 words) published biweekly from February, 1994 to the present.

Numerous and assorted outlines and summaries of presentations at conferences and trade shows on economic, financial and regulatory issues in telecommunications.

ATTACHMENT C

USTA REPLY COMMENTS
CC DOCKET NO. 96-262
NOVEMBER 9, 1998

Attachment C

USTA Reply Comments

An Economic Assessment of an Interstate-Only X-Factor

Prepared by Frank M. Gollop

Professor of Economics

Boston College

November 5, 1998

Executive Summary

This report has two objectives. The first is to emphasize that economic theory unambiguously dictates that in the context of the LECs' production technology there is no economically meaningful way to isolate a measure of productivity growth for interstate services. Interestingly, neither AT&T nor MCI even attempts to refute this axiom, even in their most recent filings. Second, where possible, data are brought to bear to evaluate the assumptions made by AT&T and MCI in their efforts to support their call for an interstate-only analysis. Five important conclusions follow from this study.

ECONOMIC THEORY INVALIDATES AN INTERSTATE-ONLY MODEL.

- It is an uncontested principle of microeconomic theory that production of multiple products with common inputs is not separable into distinct parts. Economic theory is clear. The concepts of interstate or intrastate productivity growth just do not exist. In short, one cannot examine the cost (productivity) conditions of each output in isolation because the multiple outputs are not produced in isolation. As a result, productivity growth at the level of interstate services is an undefined concept. Neither AT&T nor MCI refutes or challenges this economic principle.

EARNINGS LEVELS DO NOT MEASURE PRODUCTIVITY.

- AT&T argues that increased interstate rates of return are evidence of increased interstate-only productivity growth. This simply is false. Any computation of an interstate rate of return must be premised on an allocation of LEC costs among interstate and other services--the very cost allocation that, given common production, economic theory dictates cannot be accomplished in any economically meaningful way.

- The Commission's cost allocation rules necessarily are based on FCC conventions rather than any underlying economic reality. Since accounting measures of interstate rates of return calculated via administrative conventions are not tracking incremental changes in economic costs in interstate services, these accounting rates of return are not tracking productivity growth in interstate services.

CONTINUED RECALIBRATION OF THE X-FACTOR IS RATE-OF-RETURN REGULATION.

- Asserting that interstate rates of return are reflecting movements in "interstate" productivity growth, AT&T jumps to the policy prescription that the X-Factor should be raised. However, neither price-cap regulation nor the X-Factor mechanism is intended to recalibrate the X-Factor each year to equal actual LEC performance. A constant rate of return is not a design feature of an X-Factor model. Moreover, it is inconsistent with the very nature of incentive regulation.

- AT&T's true objective is to have the X-Factor set so that LEC earnings move to "the Commission-prescribed interstate return level." AT&T wants nothing less than to resuscitate rate-of-return regulation, dressing it up in X-Factor clothing.

AT&T'S CONCLUSIONS DRAWN FROM ITS "INTERSTATE" TFP MODEL ARE CONTRADICTED BY ITS OWN ASSUMPTIONS AND DATA.

- AT&T calculates an interstate-only X-Factor under the assumption that interstate inputs grow at the same rate as total company inputs. In its 1996 filing, AT&T characterized this approach as "conservative," leading to a downward biased measure of interstate productivity growth. MCI now embraces this position as well. I have framed this assertion as a hypothesis and tested it twice, once using AT&T's own data and a second time using data adopted by the FCC for its X-Factor model. Moreover, two tests are conducted, one premised on the AT&T and MCI representations of scale economies in LEC operations, the other based on an examination of input growth rates. In all four tests, the hypothesis is rejected. AT&T's and MCI's conclusions are simply reversed. The only possible inference of the AT&T analysis is that if one adopts the AT&T assumptions, in particular the totally unfounded assumption of equal input growth rates for interstate and non-interstate services, one would produce a downward biased measure of "interstate" input growth and therefore an upward biased measure of "interstate" TFP growth as defined by AT&T.

"INTERSTATE" TFP GROWTH CANNOT BE INFERRED SOLELY FROM GROWTH RATES FOR INTERSTATE AND TOTAL COMPANY OUTPUT.

- AT&T presses the Commission to find that interstate productivity is higher than total company productivity simply because interstate output has increased faster than has total company output. This position clearly violates the precepts of economic theory. Productivity growth for a product or service cannot be defined without quantifying the unique inputs necessary to produce that output; and inputs used in common in the industry cannot and should not be causally assigned to interstate, intrastate, and local categories.

- AT&T cites the principle that greater output growth generates greater productivity growth. In the presence of scale economies, this is a valid proposition. The problem is that these scale economies reside in the common inputs and therefore apply to the entire network taken as a whole. Since production is not separable, scale economies cannot be distinguished for interstate, intrastate, and local services.

An Economic Assessment of an Interstate-Only X-Factor

The Commission could not have been more clear when it stated in its May 1997 order: "We find no basis in the record for making an adjustment to the X-Factor to account for any differences between interstate and total company productivity."[1] Both AT&T and MCI, however, continue to press the Commission to adopt an interstate-only X-Factor. Their October 26, 1998 filings make this plea without offering any new foundation (theoretical or empirical) for their position.

This report has two principal objectives. The first is to emphasize that economic theory unambiguously dictates that in the context of the LECs' production technology there is no economically meaningful way to isolate a measure of productivity growth for interstate services. The argument is well understood and well-established in the record and requires only brief restatement. Interestingly, neither AT&T nor MCI attempts to refute this axiom, even in their most recent filings. Second, where possible, data are brought to bear to evaluate the assumptions made by AT&T and MCI in their efforts to support their call for an interstate-only analysis. Section 1 highlights briefly the unchallenged insights gleaned from economic theory. Subsequent sections evaluate AT&T and MCI arguments both in terms of economic concepts and empirical data.

1. Economic Theory

It is an uncontested principle of microeconomic theory that production of multiple products with common inputs is not separable into distinct parts. While it may be possible, as is the case for the LECs, to jurisdictionally define output categories (interstate, intrastate, and

[1] FCC Order in CC Docket 94-1, May 16, 1997 at p. 45.

local), the well-understood difficulty lies with attempting to allocate inputs and their costs. Switches, access lines, and many other common facilities are necessary for the production of local, intrastate toll, and interstate outputs. Allocating these inputs and their costs to distinct outputs contradicts the very process of common production that is observed in the industry. In short, one cannot examine the cost (productivity) conditions of each output in isolation because the multiple outputs are not produced in isolation. Taylor and Zarkadas state it well:

> Interstate and intrastate services are produced using the same facilities and inputs. An increase in demand for interstate carrier access leads to precisely the same changes in investment and expenses as an increase in the demand for intrastate carrier access or, indeed, for local usage. In these circumstances, it is impossible to distinguish between productivity growth rates of intrastate and interstate services.[2]

It is important to note that the problem is not that economic theory offers no guidance on how to allocate common costs. Economic theory is clear. Production under conditions of common costs prevents any economically meaningful allocation of costs to distinct sets of products. As a result, productivity growth at the level of interstate services is an undefined concept. It is also important to emphasize that neither AT&T nor MCI either refutes or challenges this economic principle.

2. Earnings Levels Are Not an Indicator of TFP Growth

In its October 26, 1998 filing, AT&T states: "The significant increase in the price cap LECs' interstate earnings level in recent years is a strong demonstration of the substantial productivity improvements experienced by these LECs."[3] This statement is simply false. One can make no inference from interstate earnings to interstate productivity growth. First, any computation of an "interstate rate of return" must be premised on an allocation of LEC costs among interstate and other services--the very cost allocation that, given common

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[2] Taylor, William E. and Charles Zarkadas, National Economic Research Associates, "Economic Evaluation of Selected Issues from the Fourth Further Notice of Proposed Rulemaking in the LEC Price Cap Performance Review," at 17, USTA Comments, CC Docket No. 94-1, January 16, 1996 at Attachment C.

[3] See AT&T Comments in CC Docket 94-1, October 26, 1998 at p. 24.

production, economic theory dictates cannot be accomplished in any economically meaningful way. Moreover, all parties recognize that the Commission's allocation rules necessarily are based on historical policy-based conventions rather than any underlying economic reality, as explained by a LEC opponent, Ad Hoc, in an attachment to its January 1996 reply comment: "Most LEC plant and associated expenses are assigned to the interstate and state jurisdictions on the basis of a fixed 25/75 ratio that was established by the Federal/State Joint Board in CC Docket 87-339."[4] The author of the attachment, Economics and Technology Inc., reveals its own assessment of the economic meaningfulness of cost allocations under the Part 36 rule:

> The manner by which investment costs and ongoing operating expenses as allocated between the interstate and state jurisdictions is dictated by Part 36 of the Commission's rules and bears little direct relationship to the manner in which costs are actually incurred. Consequently, it would be highly coincidental--and highly unlikely--for the pattern of cost growth in each of the two jurisdictions to track the year-to-year incremental change in economic costs engendered by the ongoing provision of services.[5]

In short, since accounting measures of interstate rates of return calculated via administrative conventions are not "track(ing) the year-to-year incremental change in economic costs" in interstate services, these accounting rates of return are not tracking productivity growth in interstate services.

For purposes of argument, however, let us assume that costs can be meaningfully allocated to interstate services so that meaningful measures of interstate productivity growth and interstate earnings could be ascertained. In short, let us assume that the LECs' increased interstate rate of return signifies all that AT&T suggests. AT&T immediately jumps to the policy prescription that the X-Factor should be raised but neither price-cap regulation nor the X-Factor mechanism is intended to recalibrate the X-Factor each year to equal actual LEC performance. A constant rate of return is not only not intended, it is

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[4] See ETI Attachment to Ad Hoc Comments in CC Docket 94-1, January 18, 1996 at p. 49.
[5] Ibid., p. 47.

inconsistent with the very nature of incentive regulation. AT&T's true objective is revealed in the following text from its October 26, 1998 filing:

> (The LECs) combined rate of return in 1997, far above the Commission-prescribed return level, confirms that the 6.5 percent productivity offset determined by the Commission in its *X-Factor Order* substantially understates LEC productivity growth....Had the newly formulated 6.5 percent X-Factor been truly reflective of the LECs' actual productivity growth, the price cap LECs' interstate earnings as a group most certainly would not have increased in 1997 but should have declined, moving much closer to the Commission-prescribed interstate return level.[6]

AT&T's position is clear: The X-Factor should be set so that LEC earnings move to "the Commission-prescribed interstate return level." AT&T wants nothing less than to resuscitate rate-of-return regulation, dressing it up in X-Factor clothing.

The important point, however, is that, in spite of what AT&T would like the Commission to believe, there is no economically meaningful link between measured interstate rate of return and "interstate" productivity. The former is a function of accounting convention, not economic reality. The latter is a phantom. In the context of common production, there is no economically meaningful concept of productivity growth for each output.

3. The AT&T "Interstate-Only" X-Factor

AT&T, through an attachment prepared by Dr. John R. Norsworthy, presents an X-Factor analysis based on the FCC model with one fundamental change. Interstate output replaces total company output in the calculation of LEC TFP growth. No attempt is made to distinguish interstate from rest-of-company inputs. Consistent with his earlier work for AT&T, Norsworthy effectively assumes equal input growth rates for interstate and rest-of-company services.

In Attachment A to the January 1996 AT&T filing, Norsworthy argues that assuming equal input growth rates for the two service classes is a "conservative" strategy.

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[6] See AT&T Comments in CC Docket 94-1, October 26, 1998 at p. 24

> Interstate access services rely more on fixed inputs, e.g. switches and transmission equipment, and less on labor and materials inputs, than do local services. Consequently, there should be greater economies of scale in the LECs' provision of interstate access than in their other telephone services. **Therefore, if we assume that inputs grow at the same rates for interstate access and other regulated telephone services provided by the LECs, the resulting implied allocation of costs is conservative.**[7] (Emphasis in original.)

MCI, in its October 26, 1998 filing, embraces the AT&T position and offers further elaboration:

> AT&T also presented the argument that assuming that interstate inputs grow at the same rate as total company outputs (in original) is a conservative assumption. This is the case because the interstate services use primarily network equipment, such as transmission and switching equipment, that are experiencing great economies of scale. By contrast, subscriber loops, which are used more heavily by local services, have a higher labor cost component, and reflect fewer economies of scale, as the growth in their use that occurs comes primarily from extending service to new neighborhoods. Given this, it is reasonable to conclude that interstate only TFP is higher than total company TFP.[8]

By "conservative" AT&T and MCI mean that, if anything, Norsworthy's assumption of equal input growth rates leads to a pro-LEC result in that, if one truly knew how to allocate costs, input growth for interstate service would be found to be less than the input growth for rest-of-company services. It therefore is AT&T's and MCI's opinion that Norsworthy's equal input growth rate assumption understates interstate TFP growth and therefore leads to a lower 'X' than would result if one knew how to correctly allocate costs. It therefore follows that if it turns out to be the case that the assumption of equal input growth rates leads to the conclusion that interstate inputs grow faster than total company inputs, then Norsworthy's equal input growth rate assumption overstates interstate TFP growth and therefore leads to a higher 'X' than would result if one knew how to correctly allocate costs.

Settling this issue requires nothing more than turning to data on output and input

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[7] See Appendix A, Statement of John R. Norsworthy, to AT&T Comments in CC Docket 94-1, January 11, 1996 at p. 27.

[8] See MCI Comments in CC Docket 94-1, October 26, 1998 at p. 28.

growth rates found in the record. To assure the reader that the results of the following analysis are not a function of data compiled for this purpose by USTA, the analysis will be conducted twice, once using AT&T's own data and a second time using data adopted by the FCC for its X-Factor model. Moreover, two tests can be conducted, one premised on the AT&T and MCI representations of scale economies in LEC operations, the other based on an examination of input growth rates. Each test is discussed separately below.

Scale Economies. AT&T and MCI offer in the above excerpts a particular characterization of scale economies in LEC operations. I have not made an independent investigation of LEC scale economies but wish, for purposes of argument, to assume that their characterizations are correct. If so, it automatically follows that Norsworthy's characterization of his research strategy as conservative is patently false--as a simple matter of economic logic. The last sentences in the above excerpts from both the AT&T and MCI filings would be true if and only if it was the case that interstate and rest-of-company outputs were growing at the same rate. If both outputs were growing at the same rate, then under Norsworthy's stated assumption of greater scale economies for interstate service, one would expect that the true input growth rate for interstate service (if it were knowable) would be lower than that for rest-of-company service, thereby making Norsworthy's assumption of equal growth rates "conservative." But Norsworthy himself in his initial 1996 study makes much of the point that interstate service volume has been growing faster (6.83%) than other output services (4.22%).[9] In so doing, Norsworthy contradicts the very basis both for his assumption that interstate and rest-of-company inputs grow at equal rates and for his inference that the equal growth rate assumption is conservative.

An examination of output growth rates in the FCC's own model leads to the same conclusion. Interstate output grew at an annual 8.80% rate over the Commission's 1986-

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[9] See Appendix A, Statement of John R. Norsworthy, to AT&T Comments in CC Docket 94-1, January 11, 1996 at p. 26.

95 study period. Over the same period, local calls and intrastate DEMs increased at annual 2.8% and 4.1% rates, respectively.[10] These vastly different output growth rates are consistent with equal input growth rates if and only if AT&T and MCI adopt the position that the asserted scale economies for interstate service is more than three times the level for local service (8.8%/2.8%) and more than twice the level for intrastate service (8.8%/4.1%). For Norsworthy's research findings to be "conservative," the scale economy differentials would have to be wider still. The simple assertion of scale economies by itself is sufficient for the AT&T and MCI position if and only if all LEC output services grow at equal rates, an assumption easily refuted by AT&T and FCC data.

Equal Input Growth Rates. When Norsworthy states that he assumes inputs grow at the same rates for interstate access and other regulated telephone services, he is inferring that the weighted sum of the growth rates of labor, capital, and material inputs is the same for both outputs. He makes this inference explicit in Attachment C of AT&T's October 26, 1998 filing. As a simple matter of arithmetic logic, this equivalence can hold if and only if the cost-share weight for each of the three inputs is equal for both interstate and rest-of-company services and/or the growth rates of the three inputs are identical (i.e., labor, capital, and material inputs each grow at, say, 2.8%). Both AT&T and MCI discard the first possibility by claiming that interstate services are more capital intensive than local services while the latter are more labor intensive than interstate services. (See above excerpts.) That leaves only the second possibility (identical input growth rates) as a potential basis for the AT&T and MCI position that interstate and rest-of-company inputs have identical growth rates.

Norsworthy presents no evidence in his attachment to AT&T's October 26, 1998 filing that labor, capital, and material inputs have identical growth rates, nor did he present such evidence in his original attachment to AT&T January 1996 submission to the Commission.

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[10] See Appendix D, FCC Order in CC Docket 94-1, May 16, 1997.

However, the machine-readable data files underlying his 1996 study display average annual growth rates for his measures of LEC labor, capital, and material inputs over the 1985-94 period as equal to -3.39%, 3.95%, and 4.05%, respectively.[11] They clearly are not equal. Consequently, given any set of realistic cost-share weights AT&T or MCI might like to apply, these unequal input growth rates refute Norsworthy's assumption of equal overall input growth rates for interstate and rest-of-company services.

The AT&T and MCI position fares no better when inspecting the input data adopted by the FCC in its X-Factor model. Over the 1985-95 period examined by the Commission, labor, capital, and material inputs grew at -3.74%, 3.21%, and 3.53% annual rates, respectively.[12]

In fact, Norsworthy's own data as well as the FCC data can be used to show that his conclusion is far from "conservative." First, the premise embraced by Norsworthy, AT&T, and MCI that interstate services are more capital intensive than non-interstate services necessarily suggests that the implied interstate cost share of capital input must (under Norsworthy's premise) be greater than the cost share of capital input in non-interstate service. (It follows that the cost shares of labor and materials must collectively be lower.) Second, Norsworthy's data as well as the FCC data reveal that capital input has grown at annual rates (3.95% and 3.21%, respectively) which are greater than the cost-share weighted average of their reported labor and material growth rates (0.93% for Norsworthy and 0.02% for the FCC).[13] The necessary inference is that, even if one could disaggregate inputs into distinct interstate and non-interstate categories, the cost-share weighted average growth rate of interstate inputs, under Norsworthy's assumptions, must be greater than the corresponding average for non-interstate inputs. After all, interstate

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[11] See data diskette accompanying Appendix A, Statement of John R. Norsworthy, to AT&T Comments in CC Docket 94-1, January 11, 1996.

[12] See Chart D11, Appendix D, FCC Order in CC Docket 94-1, May 16, 1997.

[13] See data diskette accompanying Appendix A, Statement of John R. Norsworthy, to AT&T Comments in CC Docket 94-1, January 11, 1996 and Chart D12, Appendix D, FCC Order in CC Docket 94-1, May 16, 1997.

services, according to Norsworthy, have a larger weight on the fastest growing input (capital)--precisely the opposite of what Norsworthy must maintain to be "conservative."

The important cautionary note, however, is that this qualitative conclusion simply cannot and, according to economic theory, should not be quantified. There is no economically meaningful way to allocate inputs to interstate and non-interstate services.

The important point is that Norsworthy's, AT&T's, and MCI's conclusion are simply reversed. Their arguments are not "conservative" in the sense they intend the reader to infer. The conditions necessary to support Norsworthy's assumption of equal input growth rates are simply contradicted by his own data as well as the data adopted by the FCC. The only possible inference of Norsworthy's data is that if one adopts the totally unfounded assumption of equal input growth rates for interstate and non-interstate services one would produce a downward biased measure of interstate input growth and therefore an upward biased measure of interstate TFP growth.

By how much? It is unknowable in any economically meaningful and defensible way. There is no way to separately analyze interstate and non-interstate TFP growth rates short of allocating inputs to each service class of outputs, and there is no economically meaningful way to perform this allocation. Being able to derive separate output growth rates for interstate and non-interstate output categories is simply insufficient. The only economically meaningful course is to evaluate LEC TFP growth on a company-level basis.

Finally, it is interesting to note that the above refutation of Norsworthy's interstate-only analysis based on equal growth rates was first presented in a document I prepared and was subsequently appended as an Attachment to USTA's March 1996 Reply Comment. Neither Norsworthy nor AT&T has responded to the arguments made in my attachment. Curiously, neither AT&T in its October 26, 1998 filing nor Norsworthy in his Attachment C now offers scale economies as a justification for higher interstate productivity. Neither even asserts that its assumption of equal input growth rates is conservative. In fact, neither explicitly mentions that input growth rates are assumed to be equal across LEC service

categories. Neither AT&T nor Norsworthy offers any basis for Norsworthy's interstate-only analysis in Attachment C. In its submission, AT&T simply states:

> Following the methodology used by the FCC Staff in its analysis described in the *X-Factor Order*, AT&T recomputed the LEC X-Factor amounts...by substituting LEC *interstate* output data for LEC *total company* output data formerly utilized by the FCC Staff....The following schedule shows the comparison between the X-Factors obtained by the FCC Staff on a total company basis and those determined by AT&T through the use of interstate output data....This schedule shows the pronounced differences between the productivity results using total company output data and those results recomputed to substitute the more relevant interstate output data.[14]

Absolutely no foundation for the "equal input growth rates" assumption is offered.

Norsworthy provides none either. He simply states "In order to determine what the results of the FCC Staff's X-Factor analysis would be if we used measures of the LECs' interstate output growth instead of measures of their 'total company' growth in the years 1986-95,...we recomputed Chart D1 to substitute LEC interstate output growth measures for total company output growth measures."[15] Then, without the slightest economic, institutional, engineering, or factual basis, Norsworthy draws his conclusion: Table C-1 constitutes a much more reliable estimate of the price cap LECs' interstate X-Factors (before addition of the Consumer Productivity Dividend) for the years 1986-1995 applicable to their interstate access services."[16]

In its May 1997 Order, the Commission concluded:

> AT&T and Ad Hoc calculate interstate TFP by measuring the growth in interstate outputs, but assume that interstate inputs grow at the same rate as intrastate inputs. USTA argues that it would be more reasonable to assume that interstate inputs grow at the same rate as interstate outputs. None of these parties, however, provides a factual or theoretical explanation as to why its assumptions might be correct. Accordingly, we find no basis in the record for making an adjustment to the X-Factor to account for any differences between interstate and total company productivity.[17]

AT&T does not provide any foundation for its continued application of its "equal input

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[14] See AT&T Comments in CC Docket 94-1, October 26, 1998 at pp. 20-21

[15] See Attachment C to AT&T Comments in CC Docket 94-1, October 26, 1998 at p. 2.

[16] Ibid.

[17] FCC Order in CC Docket 94-1, May 16, 1997 at pp. 45-6.

growth rates" assumption. MCI embraces the original scale economies and "conservative" assumption language offered by AT&T in 1996--a basis already rejected in the Commission's May 1997 order. Without some novel foundation for its interstate-only analysis, AT&T cannot expect the Commission to reconsider its decision to substitute a baseless interstate-only model for the economically meaningful total company approach.

4. Unequal Output Growth Rates Do Not Indicate Productivity Differentials

Those supporting an interstate-only analysis are therefore left with only one arrow in their quiver. Positing that interstate output has grown at a rate higher than that for total company output, AT&T presses the Commission to infer solely from that differential growth rate that interstate productivity must be higher than total company productivity.

> The significant differences between these two sets of output growth rates provide compelling evidence that the LEC's interstate-only productivity is substantially higher than their total company productivity. The principle is firmly established that greater output growth has a direct relationship to greater productivity growth.[18]

There are a number of responses to the AT&T position. First and most fundamentally, economic theory makes clear that in the LEC environment of common production there is no distinction between interstate, local and intrastate inputs. The critical inputs are common. They cannot and should not be causally assigned to particular output categories. It is not that common inputs present economists and regulators with a puzzle that seems to defy solution, thereby justifying some simplifying allocation rules. On the contrary, common inputs are simply that--common. They are not to be separated and assigned. Any such allocation makes no sense. It is not that the heretofore proposed allocation strategies have turned out under analysis to not be economically meaningful. It is that <u>any</u> allocation scheme is economically meaningless. Economic theory is unambiguous

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[18] See AT&T Comments in CC Docket 94-1, October 26, 1998 at p. 18.

in its policy prescription. In the case of common inputs, only a total company analysis is economically meaningful.

AT&T cites the principle that greater output growth generates greater productivity growth. In the presence of scale economies, this is a valid proposition. The problem is that the scale economies reside in the common inputs. AT&T misrepresents the testimony of experts when it attempts to distinguish output growth rates by distinct LEC network services. For example, in an effort to support its position, AT&T references a statement made by USTA.

> Significantly, even the United States Telephone Association ("USTA"), speaking for the price cap LECs in the X-Factor proceeding, pointed out that "increased [demand] growth generates productivity gains. Thus as more units of demand are carried on a LEC's network, an increase in productivity will be realized for all services...."[19]

Read carefully, the USTA statement is not addressing interstate output as distinct from intrastate or local services. It is addressing the network taken as a whole. The operative phrases in the above statement are "LEC's network" and "for all services."

5. Conclusion

Economic theory is not ambiguous. Under conditions of common costs, productivity growth has economic meaning only at the level of the total company. "Interstate-only" productivity growth is simply undefined. Moreover, stating that interstate, intrastate, and local outputs can be independently measured or illustrating that their growth rates differ is not sufficient to resuscitate the notion of interstate productivity. Distinguishing common inputs is economically meaningless.

The common cost nature of LEC production also refutes AT&T's effort to derive inferences for interstate productivity from regulatory measures of interstate rates of return.

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[19] Ibid.

Interstate earnings are a function of regulatory conventions reflected in Part 36 rules and do not reflect underlying economic conditions necessary to measure productivity growth.

Finally, AT&T attempts to derive what it asserts is a "conservative" X-Factor for interstate operations by adopting a model premised on equal growth rates for interstate and total company inputs. MCI embraces the AT&T approach. Careful analysis adopting AT&T's own assumptions and data reveals that, far from being conservative, AT&T's model yields an upward biased measure of what it calls interstate productivity.

AT&T and MCI have attempted a number of qualitative and quantitative arguments, but the ultimate conclusion is inescapable. Elementary microeconomic theory requires that an X-Factor must be based on a total company analysis of LEC operations. There is no economically meaningful option. Interestingly, neither AT&T nor MCI attempts to refute this axiom, even in their most recent filings.

ATTACHMENT D

USTA REPLY COMMENTS
CC DOCKET NO. 96-262
NOVEMBER 9, 1998

Attachment D

USTA Reply Comments

Sensitivity Analysis of the FCC X-Factor to Changes in Economic Variables

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November 5, 1998

Executive Summary

The X-Factor model adopted by the FCC in its May 1997 order is sensitive to changes in real and/or financial variables. Two simulations quantifying the sensitivity of the Commission's X-Factor to changing economic variables are examined in this report. The first reflects the fact that the reduction in RBOC employment, which proceeded at an annual -4.9% rate over the 1991-95 period, has slowed considerably in both 1996 and 1997. Assuming this slower rate will continue in the near-term future, the expected effect on the X-Factor is quantified. Second, rate restructuring under access reform dramatically shifts revenue weights among interstate outputs and therefore affects the measured rate of growth in total company output. Access reform therefore leads to a structural shift in the level of the X-Factor. Quantifying this effect is crucial for setting the X-Factor for future years. Three important conclusions follow from this study.

- TFP growth and therefore the X-Factor are very sensitive to changes in employment levels. If one expects near-term employment levels to remain stable or to decline at only half the rate observed in the 1991-95 period, then, other things equal, one should expect the X-Factor in coming years to be no less than 0.4 to 1.0 percentage points below the levels witnessed in the earlier 1991-95 period.

- Restructured rates under access reform will have an immediate impact on the measured X-Factor derived from the FCC model. It can be anticipated that this change in FCC policy will, by itself, lead to nearly a 0.2 percentage point reduction in the X-Factor calculated for 1998 and later years.

- The above simulations reflect real-world events. Since the two simulations are independent and mutually exclusive, their results are additive. As a result, it is reasonable to expect that the cumulative effect of more stable employment levels and rate restructuring is that, other things equal, the industry's X-Factor in 1998 and later years will be lower than its calculated 1991-95 levels by amounts ranging between 0.6 and 1.2 percentage points.

Projected Effect on X-Factors

More Stable Employment Levels	(Range)	- 0.4 to - 1.0
Access Reform (1998)		- 0.2
Combined Effect on X-Factor	(Range)	- 0.6 to - 1.2

Sensitivity Analysis of the FCC X-Factor to Changes in Economic Variables

The X-Factor model developed by the FCC in Appendix D to its May 1997 order is sensitive to changes in any real and/or financial variables that affect the Commission's measurement of prices and quantities for RBOC inputs and outputs. This brief report quantifies the effect of two such changes in the RBOCs' economic environment on the X-Factor as measured by the Commission. The first reflects the fact that the reduction in RBOC employment, which proceeded at an annual 4.9% rate over the 1991-95 period, has slowed considerably in both 1996 and 1997. The second addresses the expected effects of rate restructuring under access reform. Each of these "events" is simulated below. The effect of each on the Commission's measured X-Factor is quantified.

The simulations are modeled as perturbations to the FCC model. That model has been replicated and updated through 1997.[1] A complete spreadsheet display of the updated FCC model is presented in Appendix A to this report. The charts have formats identical to those specified in the original FCC Appendix D to its order dated May 1997.

1. Employment Trends

In the 1991-95 price-cap period analyzed in the original FCC model, the RBOCs experienced reductions in employment at an annual 4.9% rate. Since 1995, this rate of decrease slowed. In 1996, employment fell at a 2.57% rate. It then increased at a 0.04% in the 1997. (See Chart D6 in Appendix A.) This empirical history suggests that it might well be the case that the era of rapid labor force reductions has passed and that near-term

[1] For a complete description of this model, see Attachment D, Report of Frank M. Gollop, to USTA Comments in CC Docket 94-1, October 26, 1998.

employment trends might look more like the recent 1995-97 history than the 1991-95 record.

Since total factor productivity (TFP) is defined as the weighted average growth in outputs less the weighted average growth in inputs, the 1991-95 reductions in the RBOCs' labor force, other things equal, had a positive effect on the measured rate of total factor productivity (TFP) growth reported for that period in the FCC model. This productivity contribution disappears in 1997 because labor change is negligible in that year. It follows that, even if all other economic conditions remain unchanged, TFP growth and therefore the calculated X-Factor in the near-term future might be expected to be lower than their corresponding values observed in the FCC's study period ending in 1995. The magnitude of these expected effects can be quantified through simulation.

Two simulations were designed. The first assumes that the 2.57% reduction in employment recorded for the 1995-96 period repeated itself in 1997. This can be used to quantify the impact of a continuing reduction in employment at a rate roughly half that experienced in the 1991-95 period. The level of 1997 employment consistent with this first simulation is displayed in Chart D6 in Appendix B. The second simulation assumes that the 4.9% annual rate of decline in employment experienced over the 1991-95 period continued throughout both 1996 and 1997. This simulation quantifies the effect of now stable employment levels relative to the declining levels in the 1991-95 period. The levels of 1996 and 1997 employment corresponding to this simulation are reported in Chart D6 in Appendix C. In both simulations, the observed labor compensation rates per employee for 1996 and 1997 are maintained.[2] Total RBOC compensation is recomputed to reflect the changes in employment levels. The resulting reductions in total compensation relative to the base case in Appendix A are carried throughout the spreadsheet. In both simulations, all variables other than the simulated change in employment are held constant.

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[2] The same "Labor Rates" are used in Charts D6 in Appendices A, B, and C.

The resulting impacts on RBOC input price and TFP growth and the X-Factor (as defined and measured by the FCC) can be determined by comparing Chart D1 in Appendix A (the base FCC case) with the corresponding Charts D1 in Appendices B and C under the two respective simulations. The IPD in each simulation is largely unchanged relative to the base case (Appendix A).[3] The TFP differential, however, increases in both simulations, reflecting the expected impact of reduced employment under each scenario. This change in TFP flows through directly to the X-Factor. The ultimate impact on the X-Factor is summarized in Table 1.

The important conclusion is that measured TFP growth and therefore the X-Factor are very sensitive to changes in employment levels. Had employment in 1997 decreased at even the modest 2.57% rate exhibited in 1996, TFP growth would have been higher.[4] That did not occur and Simulation I illustrates that, as a result, the 1997 X-Factor fell by 0.61 percentage points. Moreover, had employment in both 1996 and 1997 continued to decline at the annual 4.9% rate recorded over the 1991-95 period, TFP would have increased even more than in Simulation I.[5] In the absence of that reduction in employment, the X-Factors for 1996 and 1997 decreased by 0.43 and 1.04 percentage points, respectively. The policy conclusion is that if one expects near-term employment levels either to remain stable or to decline at roughly half the rate observed in the 1991-95 period, then, other things equal, one should expect the X-Factor in the coming years to be no less than 0.4 to 1.0 percentage points below the levels witnessed in the earlier 1991-95 period.[6]

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[3] None of the input prices are altered in either simulation. The small calculated change to the IPD results from the minuscule change in input weights resulting from the simulated decrease in total compensation.

[4] Compare RBOC TFP growth rates for 1997 in Charts D1 in Appendices A and B.

[5] Compare RBOC TFP growth rates for 1996 and 1997 in Charts D1 in Appendices A and C.

[6] Relative to the 1991-95 period, simulation II identifies the effect of projected stable employment levels while simulation I illustrates the effect of continued reductions at roughly half the 1991-95 annual rate.

2. Rate Restructuring Under Access Reform

The Commission designed a restructuring of interstate rates that took effect January 1, 1998. It was the Commission's intent to make the rate changes revenue neutral so that, assuming quantities demanded are unchanged, total interstate revenues would be unaffected by the restructured rates. The effect of the price changes then would simply be a shift in interstate revenues from switched access minutes to access lines. USTA estimated that switched access revenues would have decreased by $2.6 billion in 1997 if access rate restructuring had started in 1997. (End-user revenues would have increased by the same dollar amount.) This implies that, had rate restructuring begun in 1997, switched access revenues would have decreased by nearly 30% and end-user revenues would have increased by approximately 40%. Other things equal, these revenue shifts would affect the weights applied to interstate outputs in the FCC's X-Factor model, thereby affecting the measures of TFP growth and the derivative X-Factor.

To simulate the effect of this policy change, switched access revenues are reduced by 30% in each year 1985 through 1997. End-user revenues are increased by an offsetting dollar amount to insure that total interstate revenues are unaffected. The resulting transfers are displayed in Chart D2 in Appendix D. The updated FCC model is then recomputed. Comparing Chart D4 in Appendix D with Chart D4 in Appendix A (the FCC base case) shows that the measured average annual growth rate in total interstate output over the 1986-97 period would have fallen by nearly 0.8 percentage points under access reform. Since interstate revenues have roughly a 25% share in total company revenues, growth in total company output over the 1986-97 period would have been reduced by 0.2 percentage points. (See Charts D5 in Appendices A and D.)

The simulated effects of access reform for the TFP and input price differentials and the X-Factor can be quantified by comparing the results reported in Charts D1 in Appendices A and D. Under rate restructuring only the TFP differential and the X-Factor

results are affected since the revenue-neutral model of access reform has no impact on any of the input accounts.

Table 2 displays the effect rate restructuring would have had on the annual X-Factors in the 1986-97 period. With the exception of 1986,[7] X-Factors for the RBOCs would have been reduced under access reform by amounts ranging from 0.1 to 0.4 percentage points. Average annual reductions in the X-Factor in the overall 1986-97 period would have equaled 0.20 percentage points.

The important policy conclusion is that access reform will have an immediate impact on the measured X-Factor as calculated in the FCC model. It can be anticipated that this change in FCC policy will, by itself, lead to nearly a 0.2 percentage point reduction in the X-Factor calculated for 1998 and later years in the FCC's model. It should be emphasized that a similar analysis conducted by CARE leads to a larger effect for rate restructuring because it focuses narrowly and inappropriately on interstate output. By considering total company output, the FCC model explicitly recognizes that restructured interstate rates affect only one component of RBOC output.

3. Conclusion

The simulations corresponding to the changing trend in price-cap RBOC employment and interstate rate restructuring reflect real-world events. It was the task of these two simulations not to model hypothetical events but to quantify the expected effects of recently stabilized employment levels and January 1998 access reform. The cumulative effect of these two changes to the RBOCs' economic environment can be determined by simply adding the results of the two corresponding simulations. The access reform simulation affected only output accounts while the labor simulations impacted only input accounts. The two simulations are independent and mutually exclusive; their results are additive. As

[7] TFP and the X-Factor both increase under access reform in 1986 because access line growth exceeded the rate of growth in switched access minutes in the 1985-86 period. The opposite was true in all other years.

a result, it is reasonable to expect that the cumulative effect of more stable employment levels and rate restructuring is that, other things equal, the industry's X-Factor in 1998 and later years will be lower than its calculated 1991-95 levels by amounts ranging between 0.6 and 1.2 percentage points.

Table 1

X-Factors Under Alternative Employment Simulations

	FCC Base Case	Simulation I	Simulation II	Effect of More Stable Employment on X-Factors	
		2.57% Reduction 1997	4.9% Reduction 1996 & 1997	Simulation I Reductions at 1996 Rate	Simulation II Stable Employment
	(A)	(B)	(C)	(A) - (B)	(A) - (C)
1996	2.11		2.54		- 0.43
1997	4.14	4.75	5.18	- 0.61	- 1.04

Table 2

X-Factors Under Access Reform

	FCC Base Case (A)	Simulation (B)	Effect of Access Reform (B) - (A)
1986	-1.13	-0.99	0.14
1987	6.36	6.02	-0.34
1988	6.42	6.04	-0.38
1989	6.52	6.14	-0.38
1990	8.99	8.68	-0.31
1991	6.06	5.95	-0.11
1992	3.08	2.89	-0.19
1993	3.51	3.39	-0.14
1994	5.47	5.29	-0.18
1995	6.70	6.39	-0.31
1996	2.11	1.98	-0.13
1997	4.14	4.06	-0.08
1986-1997	4.85	4.65	-0.20

APPENDIX A

UPDATED FCC MODEL

1985-1997

Chart D1: Components of FCC LEC Price Cap X-Factor [Excluding CPD]

	Input Price Growth Rates			Total Factor Productivity Growth Rates			LEC
	Total RBOCs	U.S. Nonfarm Business Sector	Differential	Total RBOCs	U.S. Nonfarm Business Sector	Differential	Price/Productivity Differential
	A	B	C=B-A	D	E	F=D-E	G=C+F
Year							
1984							
1985							
1986	5.20%	2.33%	-2.87%	2.84%	1.10%	1.74%	-1.13%
1987	0.72%	3.45%	2.73%	3.13%	-0.50%	3.63%	6.36%
1988	-1.39%	5.02%	6.41%	0.32%	0.30%	0.02%	6.42%
1989	-2.40%	2.42%	4.82%	1.90%	0.20%	1.70%	6.52%
1990	1.86%	3.31%	1.45%	6.83%	-0.70%	7.53%	8.99%
1991	-0.69%	1.77%	2.46%	2.19%	-1.41%	3.60%	6.06%
1992	2.79%	3.15%	0.36%	4.43%	1.71%	2.72%	3.08%
1993	2.47%	2.18%	-0.29%	4.00%	0.20%	3.80%	3.51%
1994	-0.05%	3.37%	3.42%	2.35%	0.30%	2.05%	5.47%
1995	1.23%	2.61%	1.38%	5.11%	-0.20%	5.31%	6.70%
1996	5.94%	3.00%	-2.94%	5.95%	0.89%	5.05%	2.11%
1997	0.90%	2.86%	1.96%	2.76%	0.58%	2.18%	4.14%
Averages							
[1986-94]	0.94%	3.00%	2.05%	3.11%	0.13%	2.98%	5.03%
[1986-95]	0.97%	2.96%	1.99%	3.31%	0.10%	3.21%	5.20%
[1987-95]	0.50%	3.03%	2.53%	3.36%	-0.01%	3.37%	5.90%
[1988-95]	0.48%	2.98%	2.50%	3.39%	0.05%	3.34%	5.84%
[1989-95]	0.74%	2.69%	1.94%	3.83%	0.01%	3.82%	5.76%
[1990-95]	1.27%	2.73%	1.46%	4.15%	-0.02%	4.17%	5.63%
[1991-95]	1.15%	2.62%	1.47%	3.62%	0.12%	3.50%	4.96%
[1986-97]	1.38%	2.95%	1.57%	3.48%	0.21%	3.28%	4.85%
[1987-97]	1.03%	3.01%	1.98%	3.54%	0.13%	3.42%	5.40%
[1988-97]	1.06%	2.97%	1.90%	3.58%	0.19%	3.40%	5.30%
[1989-97]	1.34%	2.74%	1.40%	3.95%	0.17%	3.77%	5.17%
[1990-97]	1.80%	2.78%	0.98%	4.20%	0.17%	4.03%	5.01%
[1991-97]	1.80%	2.70%	0.91%	3.83%	0.30%	3.53%	4.44%
[1992-97]	2.21%	2.86%	0.65%	4.10%	0.58%	3.52%	4.17%
[1993-97]	2.10%	2.80%	0.71%	4.03%	0.35%	3.68%	4.38%

Columns B and E for 1997 are estimated, based on the average of 1992-1996.

Chart D2: RBOC Interstate Revenues

Year	End User A	Interstate Switched Access B	Special Access C	Total Interstate D = A + B + C
1984				
1985	$1,499,413,893	$10,906,203,190	$1,960,688,644	$14,366,305,727
1986	$2,400,475,814	$10,484,265,170	$2,574,800,716	$15,459,541,700
1987	$3,090,639,929	$9,611,996,187	$2,657,677,439	$15,360,313,555
1988	$3,604,221,000	$9,662,529,000	$2,539,698,000	$15,806,448,000
1989	$4,398,692,000	$9,092,575,000	$2,253,922,000	$15,745,189,000
1990	$4,679,142,000	$8,595,750,000	$2,209,064,000	$15,483,956,000
1991	$4,828,177,000	$8,514,130,000	$2,119,037,000	$15,461,344,000
1992	$4,963,262,000	$8,650,880,000	$2,153,565,000	$15,767,707,000
1993	$5,244,094,000	$8,999,065,000	$2,097,997,000	$16,341,156,000
1994	$5,589,662,000	$9,293,783,000	$2,217,125,000	$17,100,570,000
1995	$5,770,285,000	$9,332,869,000	$2,529,667,000	$17,632,821,000
1996	$5,930,960,000	$9,409,639,000	$3,070,598,000	$18,411,197,000
1997	$6,268,026,000	$8,763,815,000	$3,851,028,000	$18,882,869,000

Chart D3: RBOC REVENUES (Excluding Miscellaneous Services)

Year	Local Service A	Intrastate Toll and Intrastate Access B	Interstate C	Total D = A + B + C
1984				
1985	$26,960,554,164	$13,047,095,682	$14,366,305,727	$54,373,955,573
1986	$28,626,174,049	$13,538,946,795	$15,459,541,700	$57,624,662,544
1987	$29,150,842,991	$14,166,723,124	$15,360,313,555	$58,677,879,670
1988	$29,226,988,000	$14,994,975,000	$15,806,448,000	$60,028,411,000
1989	$29,973,157,000	$14,868,219,000	$15,745,189,000	$60,586,565,000
1990	$30,699,085,000	$15,014,729,000	$15,483,956,000	$61,197,770,000
1991	$32,059,008,000	$14,522,276,000	$15,461,344,000	$62,042,628,000
1992	$33,359,990,000	$14,225,181,000	$15,767,707,000	$63,352,878,000
1993	$34,598,957,000	$14,496,831,000	$16,341,156,000	$65,436,944,000
1994	$35,758,637,000	$14,355,983,000	$17,100,570,000	$67,215,190,000
1995	$37,684,860,000	$13,123,225,000	$17,632,821,000	$68,440,906,000
1996	$40,523,387,000	$12,987.476,000	$18,411,197,000	$71,922,060,000
1997	$42,460,592,000	$12,308,613,000	$18,882,869,000	$73,652,074,000

Chart D4: Calculation of Fisher Ideal Index for Interstate Output

	Revenue Shares			Quantities			Output Indices			Interstate	
	End User	Interstate Switched Access	Special Access	Access Lines	Switched Access Minutes	Special Access Lines	Laspeyres	Paasche	Fisher Relative	Output Quantity Index	Growth
Year							A	B	C=(A*B)^0.5		
1984											
1985	10.44%	75.92%	13.65%	92,671,959	156,853,820,000	1,230,590	1.000000	1.000000	1.000000	1.000000	
1986	15.53%	67.82%	16.66%	95,333,884	157,302,701,000	1,664,101	1.053249	1.052253	1.052751	1.052751	5.14%
1987	20.12%	62.58%	17.30%	98,228,585	173,154,171,000	1,764,445	1.083098	1.078813	1.080953	1.137975	7.78%
1988	22.80%	61.13%	16.07%	98,270,787	187,663,836,000	2,701,817	1.144443	1.114960	1.129605	1.285462	12.19%
1989	27.94%	57.75%	14.31%	101,190,050	210,406,134,000	2,448,090	1.065766	1.058920	1.062338	1.365595	6.05%
1990	30.22%	55.51%	14.27%	103,857,988	231,960,296,000	3,518,005	1.129086	1.114500	1.121769	1.531882	11.49%
1991	31.23%	55.07%	13.71%	107,383,807	246,710,182,000	5,151,699	1.111811	1.094856	1.103301	1.690127	9.83%
1992	31.48%	54.86%	13.66%	108,938,065	262,187,655,000	6,033,139	1.062516	1.060258	1.061386	1.793878	5.96%
1993	32.09%	55.07%	12.84%	112,196,681	278,173,161,000	10,153,615	1.136148	1.102619	1.119258	2.007812	11.27%
1994	32.69%	54.35%	12.97%	115,264,861	298,342,017,323	13,824,365	1.095119	1.086800	1.090952	2.190425	8.71%
1995	32.72%	52.93%	14.35%	119,887,506	334,981,582,000	16,107,677	1.101268	1.099925	1.100596	2.410774	9.59%
1996	32.21%	51.11%	16.68%	125,333,996	362,159,903,714	20,775,150	1.099381	1.098687	1.099034	2.649522	9.44%
1997	33.19%	46.41%	20.39%	131,458,355	387,587,696,669	24,479,958	1.081366	1.083163	1.082264	2.867483	7.91%
										Average[1986-95]	8.80%
										Average[1986-97]	8.78%

Chart D5: Calculation of Fisher Ideal Index for Total Company Output

	Revenue Shares			Quantities			Output Indices			Total	
	Local Service	Intrastate Toll and Instratale Access	Interstate	Number of Local Calls	Intrastate DEMs	Interstate Quantity Index	Laspeyres	Paasche	Fisher Relative	Company Output Index	Growth
Year	A	B	C				A	B	C=(A*B)^0.5		
1984											
1985	49.58%	24.00%	26.42%	310,696,999,600	164,191,177,000	1.000000	1.000000	1.000000	1.000000	1.000000	
1986	49.68%	23.50%	26.83%	315,839,746,231	173,173,536,000	1.052751	1.035272	1.034895	1.035083	1.035083	3.45%
1987	49.68%	24.14%	26.18%	320,735,770,416	183,597,411,000	1.137975	1.043561	1.042639	1.043100	1.079696	4.22%
1988	48.69%	24.98%	26.33%	318,724,184,964	191,904,837,000	1.285462	1.041736	1.039449	1.040592	1.123522	3.98%
1989	49.47%	24.54%	25.99%	330,212,044,704	207,298,177,000	1.365595	1.054001	1.053389	1.053695	1.183850	5.23%
1990	50.16%	24.53%	25.30%	342,403,840,684	217,913,904,000	1.531882	1.062478	1.060759	1.061618	1.256797	5.98%
1991	51.67%	23.41%	24.92%	353,219,571,000	219,713,721,000	1.690127	1.044009	1.042832	1.043420	1.311367	4.25%
1992	52.66%	22.45%	24.89%	365,468,629,000	224,278,538,000	1.793878	1.038080	1.038005	1.038042	1.361254	3.73%
1993	52.87%	22.15%	24.97%	376,995,406,000	227,540,869,000	2.007812	1.049556	1.048164	1.048860	1.427765	4.77%
1994	53.20%	21.36%	25.44%	392,601,075,000	235,362,364,000	2.190425	1.052215	1.052028	1.052121	1.502182	5.08%
1995	55.06%	19.17%	25.76%	409,383,799,000	246,926,539,000	2.410774	1.058829	1.058314	1.058572	1.590167	5.69%
1996	56.34%	18.06%	25.60%	422,262,867,000	258,038,233,255	2.649522	1.051465	1.050451	1.050958	1.671199	4.97%
1997	57.65%	16.71%	25.64%	433,086,737,000	269,649,953,751	2.867483	1.043627	1.042853	1.043240	1.743462	4.23%
										Average[1986-97]	4.64%
										Average[1986-95]	4.63%

The Intrastate DEMs values for 1996 and 1997 are calculated using a 4.5% annual growth rate from the 1995 value.

Chart D6: Labor Input Price and Growth

Year	Total Employees A	Total Compensation B	Labor Rate Annual C = B / A	Labor Price Index (Base = 1985)	Labor Growth %Chg in A
1984					
1985	504,113	16,991,572,326	33705.88	1.000000	
1986	482,698	16,728,435,454	34656.11	1.028192	-4.34%
1987	477,714	16,978,905,847	35541.99	1.054474	-1.04%
1988	466,827	17,030,359,791	36481.09	1.082336	-2.31%
1989	461,149	16,910,850,694	36671.12	1.087974	-1.22%
1990	443,105	17,586,868,921	39690.07	1.177541	-3.99%
1991	414,457	17,186,211,200	41466.81	1.230255	-6.68%
1992	411,167	17,160,988,000	41737.27	1.238279	-0.80%
1993	395,639	17,956,438,000	45385.91	1.346528	-3.85%
1994	367,196	17,154,284,000	46716.97	1.386018	-7.46%
1995	346,843	16,203,522,000	46717.17	1.386024	-5.70%
1996	338,040	16,597,889,075	49100.37	1.456730	-2.57%
1997	338,177	17,451,673,000	51605.14	1.531043	0.04%
				Average[1986-95]	-3.74%
				Average[1986-97]	-3.33%

Chart D7: Summary of Capital Adjustments and Average Depreciation

Year	TPIS.BOY A	Unadj. Additions B	TPIS.EOY C	Retires D=A+B-C	Adjustment Factor E	Adjusted Additions F = B * E	Adjusted EOY TPIS G = A+F-D	Depreciation Accruals H	Adjusted Depreciation Rate I=H/((A+G)/2)
1984									
1985	138,879,365	15,001,998	149,061,793	4,819,569	0.8880	13,321,774	147,381,569	10,241,376	7.155%
1986	149,061,793	14,842,725	159,010,189	4,894,328	0.8880	13,180,340	157,347,804	11,826,961	7.720%
1987	159,010,189	14,138,370	167,720,577	5,427,983	0.8880	12,554,872	166,137,079	13,311,655	8.188%
1988	168,505,114	14,284,742	175,860,216	6,929,640	1.0000	14,284,742	175,860,216	13,134,992	7.629%
1989	175,860,216	13,283,569	182,978,381	6,165,404	1.0000	13,283,569	182,978,381	13,420,810	7.480%
1990	182,978,381	14,476,334	187,168,695	10,286,020	1.0000	14,476,334	187,168,695	13,439,933	7.262%
1991	187,168,695	14,527,049	192,034,545	9,661,199	1.0000	14,527,049	192,034,545	13,200,593	6.962%
1992	192,034,545	14,611,866	196,411,915	10,234,496	1.0000	14,611,866	196,411,915	13,337,581	6.867%
1993	196,411,915	14,860,116	203,082,418	8,189,613	1.0000	14,860,116	203,082,418	14,032,782	7.025%
1994	203,082,418	14,717,999	209,325,562	8,474,855	1.0000	14,717,999	209,325,562	14,863,196	7.208%
1995	209,325,562	15,374,568	217,430,207	7,269,923	1.0000	15,374,568	217,430,207	15,358,553	7.198%
1996	217,430,207	18,026,150	227,317,120	8,139,237	1.0000	18,026,150	227,317,120	16,252,281	7.309%
1997	227,317,120	18,253,199	236,896,179	8,674,140	1.0000	18,253,199	236,896,179	16,667,034	7.181%
								Average[1985-95]	7.336%
								Average[1985-97]	7.322%

Chart D8: Construction of Materials Quantity Index

Year	Materials Price Index (1985=1.00) A	Operating Expense B	Depreciation & Amortization Expense C	Employee Compensation D	Materials Expense E = B - C - D	Materials Quantity Index F = E / A	Materials Quantity Index (1985 = 1.0) G	Materials Quantity Index Growth H
1984								
1985	1.000000	40,953,072,435	10,024,710,656	16,991,572,326	13,936,789,453	13,936,789,453	1.000000	
1986	1.031346	42,424,084,849	11,592,001,248	16,728,435,454	14,103,648,147	13,674,987,526	0.981215	-1.90%
1987	1.053529	44,293,127,430	13,316,999,560	16,978,905,847	13,997,222,023	13,286,033,126	0.953307	-2.89%
1988	1.086392	46,809,139,000	13,646,937,000	17,030,359,791	16,131,842,209	14,849,003,149	1.065454	11.12%
1989	1.126234	48,600,813,000	13,860,101,000	16,910,850,694	17,829,861,306	15,831,394,231	1.135943	6.41%
1990	1.172025	49,544,744,000	13,931,515,000	17,586,868,921	18,026,360,079	15,380,530,820	1.103592	-2.89%
1991	1.204935	50,901,049,000	13,499,778,000	17,186,211,200	20,215,059,800	16,776,884,245	1.203784	8.69%
1992	1.234797	50,698,625,000	13,822,882,000	17,160,988,000	19,714,755,000	15,965,992,971	1.145601	-4.95%
1993	1.255352	52,766,635,000	14,244,514,000	17,956,438,000	20,565,683,000	16,382,401,649	1.175479	2.57%
1994	1.291436	55,916,863,000	15,068,058,000	17,154,284,000	23,694,521,000	18,347,418,469	1.316474	11.33%
1995	1.321671	56,831,094,000	15,556,284,000	16,203,522,000	25,071,288,000	18,969,381,288	1.361101	3.33%
1996	1.361400	57,884,494,000	16,377,242,000	16,597,889,075	24,909,362,925	18,296,870,339	1.312847	-3.61%
1997	1.395497	59,731,175,000	16,758,832,000	17,451,673,000	25,520,670,000	18,287,867,671	1.312201	-0.05%

Chart D8a: Adjustments of 1985-87 RBOC Operating Expenses for Accounting Changes

	USTA Study Operating Expense A	Nonregulated Expense Adjustmts B	Capital/Expense Shift C	Shift Factor D = (A+B+C)/A	RBOC Operating Expense E	Adjusted Operating Exp. F = D * E
1985	46,223,368,251	406,886,403	1,985,079,714	1.05175	38,938,104,053	40,953,072,435
1986	48,113,849,487	471,112,072	1,959,363,711	1.05052	40,384,079,165	42,424,084,849
1987	49,562,282,080	1,089,570,002	1,908,791,665	1.06050	41,766,392,483	44,293,127,430

Chart D9: Capital Quantity and Price Index Calculations

Year	Benchmark A	Adjusted Capital Additions B	BEA Composite Asset Price C	Capital Stock Quantity D	Capital Input Quantity E	Capital Input Quantity Growth F	Property Income /w Depreciation G	Capital Rental Price** H	Capital Rental Price Index I	Rental Price Index Growth J
1984		n/a		103,903,095						
1985	109,602,959	13,321,774	1.000000	109,602,710	1.000000		23,445,593,794	0.225648657	1.000000	
1986		13,180,340	1.010482	114,606,056	1.054855	0.053403	26,792,578,943	0.244451792	1.083329	8.00%
1987		12,554,872	1.027339	118,419,511	1.103009	0.044639	27,701,751,800	0.241712809	1.071191	-1.13%
1988		14,284,742	1.030466	123,594,868	1.139711	0.032733	26,866,209,000	0.226873162	1.005427	-6.34%
1989		13,283,569	1.070178	126,940,642	1.189521	0.042776	25,845,853,000	0.209117526	0.926740	-8.15%
1990		14,476,334	1.089729	130,912,833	1.221721	0.026711	25,584,541,000	0.201547279	0.893191	-3.69%
1991		14,527,049	1.102220	134,489,094	1.259951	0.030812	24,641,357,000	0.188227208	0.834161	-6.84%
1992		14,611,866	1.108304	137,807,183	1.294370	0.026951	26,477,135,000	0.196871985	0.872471	4.49%
1993		14,860,116	1.112312	141,057,540	1.326305	0.024372	26,914,823,000	0.195307838	0.865540	-0.80%
1994		14,717,999	1.117639	143,878,628	1.357587	0.023312	26,366,385,000	0.18691936	0.828365	-4.39%
1995		15,374,568	1.114809	147,115,146	1.384739	0.019802	27,166,096,000	0.188812588	0.836755	1.01%
1996		18,026,150	1.120672	152,408,144	1.415888	0.022246	30,414,808,000	0.206741514	0.916210	9.07%
1997		18,253,199	1.120672	157,515,458	1.466830	0.035346	30,679,731,000	0.201299813	0.892094	-2.67%

Chart D10: Factor Shares of Total Payments

Year	Labor Compensation	Materials Payment	Property Income /w Depreciation	Total Factor Payment	Labor Compensation Share	Materials Payment Share	Property Income /w Depreciation Share
1984							
1985	16,991,572,326	13,936,789,453	23,445,593,794	54,373,955,573	31.25%	25.63%	43.12%
1986	16,728,435,454	14,103,648,147	26,792,578,943	57,624,662,544	29.03%	24.48%	46.49%
1987	16,978,905,847	13,997,222,023	27,701,751,800	58,677,879,670	28.94%	23.85%	47.21%
1988	17,030,359,791	16,131,842,209	26,866,209,000	60,028,411,000	28.37%	26.87%	44.76%
1989	16,910,850,694	17,829,861,306	25,845,853,000	60,586,565,000	27.91%	29.43%	42.66%
1990	17,586,868,921	18,026,360,079	25,584,541,000	61,197,770,000	28.74%	29.46%	41.81%
1991	17,186,211,200	20,215,059,800	24,641,357,000	62,042,628,000	27.70%	32.58%	39.72%
1992	17,160,988,000	19,714,755,000	26,477,135,000	63,352,878,000	27.09%	31.12%	41.79%
1993	17,956,438,000	20,565,683,000	26,914,823,000	65,436,944,000	27.44%	31.43%	41.13%
1994	17,154,284,000	23,694,521,000	26,366,385,000	67,215,190,000	25.52%	35.25%	39.23%
1995	16,203,522,000	25,071,288,000	27,166,096,000	68,440,906,000	23.68%	36.63%	39.69%
1996	16,597,889,075	24,909,362,925	30,414,808,000	71,922,060,000	23.08%	34.63%	42.29%
1997	17,451,673,000	25,520,670,000	30,679,731,000	73,652,074,000	23.69%	34.65%	41.65%

Chart D11: Input Quantity Index

	Shares			Quantities			Quantity Indices				
Year	Labor Compensation	Materials Payment	Property Income /w Depreciation	Labor	Materials	Capital	Laspeyres A	Paasche B	Fisher Relative C=(A*B)^0.5	Fisher Chain	Growth
1984											
1985	31.25%	25.63%	43.12%	504,113	13,936,789,453	1.00000	1.00000	1.00000	1.00000	1.00000	
1986	29.03%	24.48%	46.49%	482,698	13,674,987,526	1.05486	0.96820	0.96822	1.00611	1.00611	0.61%
1987	28.94%	23.85%	47.21%	477,714	13,286,033,126	1.10301	0.98139	0.98140	1.01099	1.01717	1.09%
1988	28.37%	26.87%	44.76%	466,827	14,849,003,149	1.13971	1.04067	1.04083	1.03731	1.05512	3.66%
1989	27.91%	29.43%	42.66%	461,149	15,831,394,231	1.18952	1.02594	1.02654	1.03384	1.09082	3.33%
1990	28.74%	29.46%	41.81%	443,105	15,380,530,820	1.22172	0.96634	0.96623	0.99151	1.08156	-0.85%
1991	27.70%	32.58%	39.72%	414,457	16,776,884,245	1.25995	1.01403	1.01340	1.02084	1.10410	2.06%
1992	27.09%	31.12%	41.79%	411,167	15,965,992,971	1.29437	0.97023	0.97005	0.99305	1.09642	-0.70%
1993	27.44%	31.43%	41.13%	395,639	16,382,401,649	1.32630	0.99637	0.99530	1.00769	1.10484	0.77%
1994	25.52%	35.25%	39.23%	367,196	18,347,418,469	1.35759	1.03052	1.03050	1.02772	1.13547	2.73%
1995	23.68%	36.63%	39.69%	346,843	18,969,381,288	1.38474	0.99639	0.99689	1.00579	1.14205	0.58%
1996	23.08%	34.63%	42.29%	338,040	18,296,870,339	1.41589	0.96850	0.96855	0.99029	1.13096	-0.98%
1997	23.69%	34.65%	41.65%	338,177	18,287,867,671	1.46683	0.99987	0.99987	1.01487	1.14778	1.48%

Chart D12: Input Price Index

	Shares			Prices			Price Indices				
Year	Labor Compensation	Materials Payment	Property Income /w Depreciation	Labor	Materials	Capital	Laspeyres A	Paasche B	Fisher Relative C=(A*B)^0.5	Fisher Chain	Growth
1984											
1985	31.25%	25.63%	43.12%	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	
1986	29.03%	24.48%	46.49%	1.02819	1.03135	1.08333	1.06395	1.06482	1.05335	1.05335	5.20%
1987	28.94%	23.85%	47.21%	1.05447	1.05353	1.07119	1.00008	0.99954	1.00720	1.06094	0.72%
1988	28.37%	26.87%	44.76%	1.08234	1.08639	1.00543	0.96969	0.97133	0.98622	1.04632	-1.39%
1989	27.91%	29.43%	42.66%	1.08797	1.12623	0.92674	0.96486	0.96543	0.97626	1.02148	-2.40%
1990	28.74%	29.46%	41.81%	1.17754	1.17202	0.89319	0.99518	0.99415	1.01874	1.04063	1.86%
1991	27.70%	32.58%	39.72%	1.23025	1.20494	0.83416	0.97284	0.97412	0.99311	1.03346	-0.69%
1992	27.09%	31.12%	41.79%	1.23828	1.23480	0.87247	1.03640	1.03680	1.02827	1.06267	2.79%
1993	27.44%	31.43%	41.13%	1.34653	1.25535	0.86554	1.00255	1.00256	1.02502	1.08926	2.47%
1994	25.52%	35.25%	39.23%	1.38602	1.29144	0.82836	0.98810	0.98970	0.99947	1.08868	-0.05%
1995	23.68%	36.63%	39.69%	1.38602	1.32167	0.83675	1.01642	1.01646	1.01237	1.10215	1.23%
1996	23.08%	34.63%	42.29%	1.45673	1.36140	0.91621	1.06381	1.06475	1.06116	1.16956	5.94%
1997	23.69%	34.65%	41.65%	1.53104	1.39550	0.89209	0.99681	0.99635	1.00905	1.18015	0.90%

APPENDIX B

EMPLOYMENT SIMULATION

1997/96 GROWTH SET AT -2.57%

Chart D1: Components of FCC LEC Price Cap X-Factor [Excluding CPD]

	Input Price Growth Rates			Total Factor Productivity Growth Rates			LEC
	Total RBOCs	U.S. Nonfarm Business Sector	Differential	Total RBOCs	U.S. Nonfarm Business Sector	Differential	Price/Productivity Differential
	A	B	C=B-A	D	E	F=D-E	G=C+F
Year							
1984							
1985							
1986	5.20%	2.33%	-2.87%	2.84%	1.10%	1.74%	-1.13%
1987	0.72%	3.45%	2.73%	3.13%	-0.50%	3.63%	6.36%
1988	-1.39%	5.02%	6.41%	0.32%	0.30%	0.02%	6.42%
1989	-2.40%	2.42%	4.82%	1.90%	0.20%	1.70%	6.52%
1990	1.86%	3.31%	1.45%	6.83%	-0.70%	7.53%	8.99%
1991	-0.69%	1.77%	2.46%	2.19%	-1.41%	3.60%	6.06%
1992	2.79%	3.15%	0.36%	4.43%	1.71%	2.72%	3.08%
1993	2.47%	2.18%	-0.29%	4.00%	0.20%	3.80%	3.51%
1994	-0.05%	3.37%	3.42%	2.35%	0.30%	2.05%	5.47%
1995	1.23%	2.61%	1.38%	5.11%	-0.20%	5.31%	6.70%
1996	5.94%	3.00%	-2.94%	5.95%	0.89%	5.05%	2.11%
1997	0.89%	2.86%	1.97%	3.36%	0.58%	2.78%	4.75%
Averages							
[1986-94]	0.94%	3.00%	2.05%	3.11%	0.13%	2.98%	5.03%
[1986-95]	0.97%	2.96%	1.99%	3.31%	0.10%	3.21%	5.20%
[1987-95]	0.50%	3.03%	2.53%	3.36%	-0.01%	3.37%	5.90%
[1988-95]	0.48%	2.98%	2.50%	3.39%	0.05%	3.34%	5.84%
[1989-95]	0.74%	2.69%	1.94%	3.83%	0.01%	3.82%	5.76%
[1990-95]	1.27%	2.73%	1.46%	4.15%	-0.02%	4.17%	5.63%
[1991-95]	1.15%	2.62%	1.47%	3.62%	0.12%	3.50%	4.96%
[1986-97]	1.38%	2.95%	1.58%	3.53%	0.21%	3.33%	4.90%
[1987-97]	1.03%	3.01%	1.98%	3.60%	0.13%	3.47%	5.45%
[1988-97]	1.06%	2.97%	1.90%	3.64%	0.19%	3.46%	5.36%
[1989-97]	1.34%	2.74%	1.40%	4.01%	0.17%	3.84%	5.24%
[1990-97]	1.80%	2.78%	0.98%	4.28%	0.17%	4.11%	5.08%
[1991-97]	1.80%	2.70%	0.91%	3.91%	0.30%	3.62%	4.53%
[1992-97]	2.21%	2.86%	0.65%	4.20%	0.58%	3.62%	4.27%
[1993-97]	2.09%	2.80%	0.71%	4.15%	0.35%	3.80%	4.51%

Columns B and E for 1997 are estimated, based on the average of 1992-1996.

Chart D6: Labor Input Price and Growth

Year	Total Employees A	Total Compensation B	Labor Rate Annual C = B / A	Labor Price Index (Base = 1985)	Labor Growth %Chg in A
1984					
1985	504,113	16,991,572,326	33705.88	1.000000	
1986	482,698	16,728,435,454	34656.11	1.028192	-4.34%
1987	477,714	16,978,905,847	35541.99	1.054474	-1.04%
1988	466,827	17,030,359,791	36481.09	1.082336	-2.31%
1989	461,149	16,910,850,694	36671.12	1.087974	-1.22%
1990	443,105	17,586,868,921	39690.07	1.177541	-3.99%
1991	414,457	17,186,211,200	41466.81	1.230255	-6.68%
1992	411,167	17,160,988,000	41737.27	1.238279	-0.80%
1993	395,639	17,956,438,000	45385.91	1.346528	-3.85%
1994	367,196	17,154,284,000	46716.97	1.386018	-7.46%
1995	346,843	16,203,522,000	46717.17	1.386024	-5.70%
1996	338,040	16,597,889,075	49100.37	1.456730	-2.57%
1997	329,460	17,001,830,954	51605.14	1.531043	-2.57%
				Average[1986-95]	-3.74%
				Average[1986-97]	-3.54%

APPENDIX C

EMPLOYMENT SIMULATION

1996/95 AND 1997/96 GROWTH SET AT -4.9%

Chart D1: Components of FCC LEC Price Cap X-Factor [Excluding CPD]

	Input Price Growth Rates			Total Factor Productivity Growth Rates			LEC Price/Productivity Differential
	Total RBOCs	U.S. Nonfarm Business Sector	Differential	Total RBOCs	U.S. Nonfarm Business Sector	Differential	
	A	B	C=B-A	D	E	F=D-E	G=C+F
Year							
1984							
1985							
1986	5.20%	2.33%	-2.87%	2.84%	1.10%	1.74%	-1.13%
1987	0.72%	3.45%	2.73%	3.13%	-0.50%	3.63%	6.36%
1988	-1.39%	5.02%	6.41%	0.32%	0.30%	0.02%	6.42%
1989	-2.40%	2.42%	4.82%	1.90%	0.20%	1.70%	6.52%
1990	1.86%	3.31%	1.45%	6.83%	-0.70%	7.53%	8.99%
1991	-0.69%	1.77%	2.46%	2.19%	-1.41%	3.60%	6.06%
1992	2.79%	3.15%	0.36%	4.43%	1.71%	2.72%	3.08%
1993	2.47%	2.18%	-0.29%	4.00%	0.20%	3.80%	3.51%
1994	-0.05%	3.37%	3.42%	2.35%	0.30%	2.05%	5.47%
1995	1.23%	2.61%	1.38%	5.11%	-0.20%	5.31%	6.70%
1996	5.94%	3.00%	-2.94%	6.38%	0.89%	5.49%	2.54%
1997	0.86%	2.86%	2.00%	3.76%	0.58%	3.18%	5.18%
Averages							
[1986-94]	0.94%	3.00%	2.05%	3.11%	0.13%	2.98%	5.03%
[1986-95]	0.97%	2.96%	1.99%	3.31%	0.10%	3.21%	5.20%
[1987-95]	0.50%	3.03%	2.53%	3.36%	-0.01%	3.37%	5.90%
[1988-95]	0.48%	2.98%	2.50%	3.39%	0.05%	3.34%	5.84%
[1989-95]	0.74%	2.69%	1.94%	3.83%	0.01%	3.82%	5.76%
[1990-95]	1.27%	2.73%	1.46%	4.15%	-0.02%	4.17%	5.63%
[1991-95]	1.15%	2.62%	1.47%	3.62%	0.12%	3.50%	4.96%
[1986-97]	1.38%	2.95%	1.58%	3.60%	0.21%	3.40%	4.97%
[1987-97]	1.03%	3.01%	1.98%	3.67%	0.13%	3.55%	5.53%
[1988-97]	1.06%	2.97%	1.91%	3.73%	0.19%	3.54%	5.45%
[1989-97]	1.33%	2.74%	1.41%	4.11%	0.17%	3.93%	5.34%
[1990-97]	1.80%	2.78%	0.98%	4.38%	0.17%	4.21%	5.19%
[1991-97]	1.79%	2.70%	0.91%	4.03%	0.30%	3.74%	4.65%
[1992-97]	2.21%	2.86%	0.65%	4.34%	0.58%	3.76%	4.41%
[1993-97]	2.09%	2.80%	0.71%	4.32%	0.35%	3.97%	4.68%

Columns B and E for 1997 are estimated, based on the average of 1992-1996.

Chart D6: Labor Input Price and Growth

Year	Total Employees A	Total Compensation B	Labor Rate Annual C = B / A	Labor Price Index (Base = 1985)	Labor Growth %Chg in A
1984					
1985	504,113	16,991,572,326	33705.88	1.000000	
1986	482,698	16,728,435,454	34656.11	1.028192	-4.34%
1987	477,714	16,978,905,847	35541.99	1.054474	-1.04%
1988	466,827	17,030,359,791	36481.09	1.082336	-2.31%
1989	461,149	16,910,850,694	36671.12	1.087974	-1.22%
1990	443,105	17,586,868,921	39690.07	1.177541	-3.99%
1991	414,457	17,186,211,200	41466.81	1.230255	-6.68%
1992	411,167	17,160,988,000	41737.27	1.238279	-0.80%
1993	395,639	17,956,438,000	45385.91	1.346528	-3.85%
1994	367,196	17,154,284,000	46716.97	1.386018	-7.46%
1995	346,843	16,203,522,000	46717.17	1.386024	-5.70%
1996	331,739	16,288,507,643	49100.37	1.456730	-4.45%
1997	317,242	16,371,319,297	51605.14	1.531043	-4.47%
				Average[1986-95]	-3.74%
				Average[1986-97]	-3.86%

APPENDIX D

ACCESS REFORM SIMULATION

Chart D1: Components of FCC LEC Price Cap X-Factor [Excluding CPD]

	Input Price Growth Rates			Total Factor Productivity Growth Rates			LEC
	Total RBOCs	U.S. Nonfarm Business Sector	Differential	Total RBOCs	U.S. Nonfarm Business Sector	Differential	Price/Productivity Differential
	A	B	C=B-A	D	E	F=D-E	G=C+F
Year							
1984							
1985							
1986	5.20%	2.33%	-2.87%	2.98%	1.10%	1.88%	-0.99%
1987	0.72%	3.45%	2.73%	2.79%	-0.50%	3.29%	6.02%
1988	-1.39%	5.02%	6.41%	-0.06%	0.30%	-0.36%	6.04%
1989	-2.40%	2.42%	4.82%	1.51%	0.20%	1.31%	6.14%
1990	1.86%	3.31%	1.45%	6.53%	-0.70%	7.23%	8.68%
1991	-0.69%	1.77%	2.46%	2.07%	-1.41%	3.49%	5.95%
1992	2.79%	3.15%	0.36%	4.24%	1.71%	2.53%	2.89%
1993	2.47%	2.18%	-0.29%	3.89%	0.20%	3.69%	3.39%
1994	-0.05%	3.37%	3.42%	2.17%	0.30%	1.87%	5.29%
1995	1.23%	2.61%	1.38%	4.81%	-0.20%	5.01%	6.39%
1996	5.94%	3.00%	-2.94%	5.81%	0.89%	4.92%	1.98%
1997	0.90%	2.86%	1.96%	2.68%	0.58%	2.10%	4.06%
Averages							
[1986-94]	0.94%	3.00%	2.05%	2.90%	0.13%	2.77%	4.82%
[1986-95]	0.97%	2.96%	1.99%	3.09%	0.10%	2.99%	4.98%
[1987-95]	0.50%	3.03%	2.53%	3.11%	-0.01%	3.12%	5.64%
[1988-95]	0.48%	2.98%	2.50%	3.15%	0.05%	3.10%	5.60%
[1989-95]	0.74%	2.69%	1.94%	3.60%	0.01%	3.59%	5.53%
[1990-95]	1.27%	2.73%	1.46%	3.95%	-0.02%	3.97%	5.43%
[1991-95]	1.15%	2.62%	1.47%	3.44%	0.12%	3.32%	4.78%
[1986-97]	1.38%	2.95%	1.57%	3.29%	0.21%	3.08%	4.65%
[1987-97]	1.03%	3.01%	1.98%	3.31%	0.13%	3.19%	5.17%
[1988-97]	1.06%	2.97%	1.90%	3.37%	0.19%	3.18%	5.08%
[1989-97]	1.34%	2.74%	1.40%	3.75%	0.17%	3.57%	4.98%
[1990-97]	1.80%	2.78%	0.98%	4.03%	0.17%	3.85%	4.83%
[1991-97]	1.80%	2.70%	0.91%	3.67%	0.30%	3.37%	4.28%
[1992-97]	2.21%	2.86%	0.65%	3.93%	0.58%	3.35%	4.00%
[1993-97]	2.10%	2.80%	0.71%	3.87%	0.35%	3.52%	4.22%

Columns B and E for 1997 are estimated, based on the average of 1992-1996.

Chart D2: RBOC Interstate Revenues

Year	End User A	Interstate Switched Access B	Special Access C	Total Interstate D = A + B + C
1984				
1985	$4,702,649,814	$7,702,967,269	$1,960,688,644	$14,366,305,727
1986	$5,479,785,287	$7,404,955,697	$2,574,800,716	$15,459,541,700
1987	$5,913,757,280	$6,788,878,836	$2,657,677,439	$15,360,313,555
1988	$6,442,180,227	$6,824,569,773	$2,539,698,000	$15,806,448,000
1989	$7,069,251,345	$6,422,015,655	$2,253,922,000	$15,745,189,000
1990	$7,203,780,014	$6,071,111,986	$2,209,064,000	$15,483,956,000
1991	$7,328,842,591	$6,013,464,409	$2,119,037,000	$15,461,344,000
1992	$7,504,092,120	$6,110,049,880	$2,153,565,000	$15,767,707,000
1993	$7,887,188,738	$6,355,970,262	$2,097,997,000	$16,341,156,000
1994	$8,319,317,686	$6,564,127,314	$2,217,125,000	$17,100,570,000
1995	$8,511,420,545	$6,591,733,455	$2,529,667,000	$17,632,821,000
1996	$8,694,643,486	$6,645,955,514	$3,070,598,000	$18,411,197,000
1997	$8,843,026,000	$6,188,815,000	$3,851,028,000	$18,882,869,000

Chart D4: Calculation of Fisher Ideal Index for Interstate Output

	Revenue Shares			Quantities			Output Indices			Interstate	
	End User	Interstate Switched Access	Special Access	Access Lines	Switched Access Minutes	Special Access Lines	Laspeyres	Paasche	Fisher Relative	Output Quantity Index	Growth
Year							A	B	C=(A*B)^0.5		
1984											
1985	32.73%	53.62%	13.65%	92,671,959	156,853,820,000	1,230,590	1.000000	1.000000	1.000000	1.000000	
1986	35.45%	47.90%	16.66%	95,333,884	157,302,701,000	1,664,101	1.059015	1.057811	1.058413	1.058413	5.68%
1987	38.50%	44.20%	17.30%	98,228,585	173,154,171,000	1,764,445	1.069074	1.065696	1.067384	1.129733	6.52%
1988	40.76%	43.18%	16.07%	98,270,787	187,663,836,000	2,701,817	1.129120	1.098059	1.113481	1.257937	10.75%
1989	44.90%	40.79%	14.31%	101,190,050	210,406,134,000	2,448,090	1.049342	1.044062	1.046698	1.316680	4.56%
1990	46.52%	39.21%	14.27%	103,857,988	231,960,296,000	3,518,005	1.116183	1.101048	1.108589	1.459657	10.31%
1991	47.40%	38.89%	13.71%	107,383,807	246,710,182,000	5,151,699	1.106979	1.089656	1.098283	1.603117	9.37%
1992	47.59%	38.75%	13.66%	108,938,065	262,187,655,000	6,033,139	1.054710	1.052210	1.053460	1.688819	5.21%
1993	48.27%	38.90%	12.84%	112,196,681	278,173,161,000	10,153,615	1.131143	1.097058	1.113970	1.881294	10.79%
1994	48.65%	38.39%	12.97%	115,264,861	298,342,017,323	13,824,365	1.087815	1.079128	1.083463	2.038311	8.02%
1995	48.27%	37.38%	14.35%	119,887,506	334,981,582,000	16,107,677	1.088066	1.086765	1.087415	2.216491	8.38%
1996	47.22%	36.10%	16.68%	125,333,996	362,159,903,714	20,775,150	1.093831	1.092993	1.093412	2.423537	8.93%
1997	46.83%	32.77%	20.39%	131,458,355	387,587,696,669	24,479,958	1.078162	1.080129	1.079145	2.615347	7.62%
										Average[1986-95]	7.96%
										Average[1986-97]	8.01%

Chart D5: Calculation of Fisher Ideal Index for Total Company Output

	Revenue Shares			Quantities			Output Indices			Total	
	Local Service	Intrastate Toll and Instratate Access	Interstate	Number of Local Calls	Intrastate DEMs	Interstate Quantity Index	Laspeyres	Paasche	Fisher Relative	Company Output Index	Growth
Year	A	B	C				A	B	C=(A*B)^0.5		
1984											
1985	49.58%	24.00%	26.42%	310,696,999,600	164,191,177,000	1.000000	1.000000	1.000000	1.000000	1.000000	
1986	49.68%	23.50%	26.83%	315,839,746,231	173,173,536,000	1.058413	1.036768	1.036357	1.036562	1.036562	3.59%
1987	49.68%	24.14%	26.18%	320,735,770,416	183,597,411,000	1.129733	1.039921	1.039303	1.039612	1.077623	3.88%
1988	48.69%	24.98%	26.33%	318,724,184,964	191,904,837,000	1.257937	1.037515	1.035815	1.036665	1.117133	3.60%
1989	49.47%	24.54%	25.99%	330,212,044,704	207,298,177,000	1.316680	1.049883	1.049349	1.049616	1.172561	4.84%
1990	50.16%	24.53%	25.30%	342,403,840,684	217,913,904,000	1.459657	1.059053	1.057750	1.058401	1.241040	5.68%
1991	51.67%	23.41%	24.92%	353,219,571,000	219,713,721,000	1.603117	1.042739	1.041711	1.042225	1.293442	4.14%
1992	52.66%	22.45%	24.89%	365,468,629,000	224,278,538,000	1.688819	1.036105	1.036107	1.036106	1.340143	3.55%
1993	52.87%	22.15%	24.97%	376,995,406,000	227,540,869,000	1.881294	1.048240	1.047002	1.047621	1.403962	4.65%
1994	53.20%	21.36%	25.44%	392,601,075,000	235,362,364,000	2.038311	1.050345	1.050247	1.050296	1.474575	4.91%
1995	55.06%	19.17%	25.76%	409,383,799,000	246,926,539,000	2.216491	1.055476	1.055146	1.055311	1.556135	5.38%
1996	56.34%	18.06%	25.60%	422,262,867,000	258,038,233,255	2.423537	1.050017	1.049131	1.049574	1.633278	4.84%
1997	57.65%	16.71%	25.64%	433,086,737,000	269,649,953,751	2.615347	1.042829	1.042109	1.042469	1.702642	4.16%
										Average[1986-97]	4.42%
										Average[1986-95]	4.43%

The Intrastate DEMs values for 1996 and 1997 are calculated using a 4.5% annual growth rate from the 1995 value.